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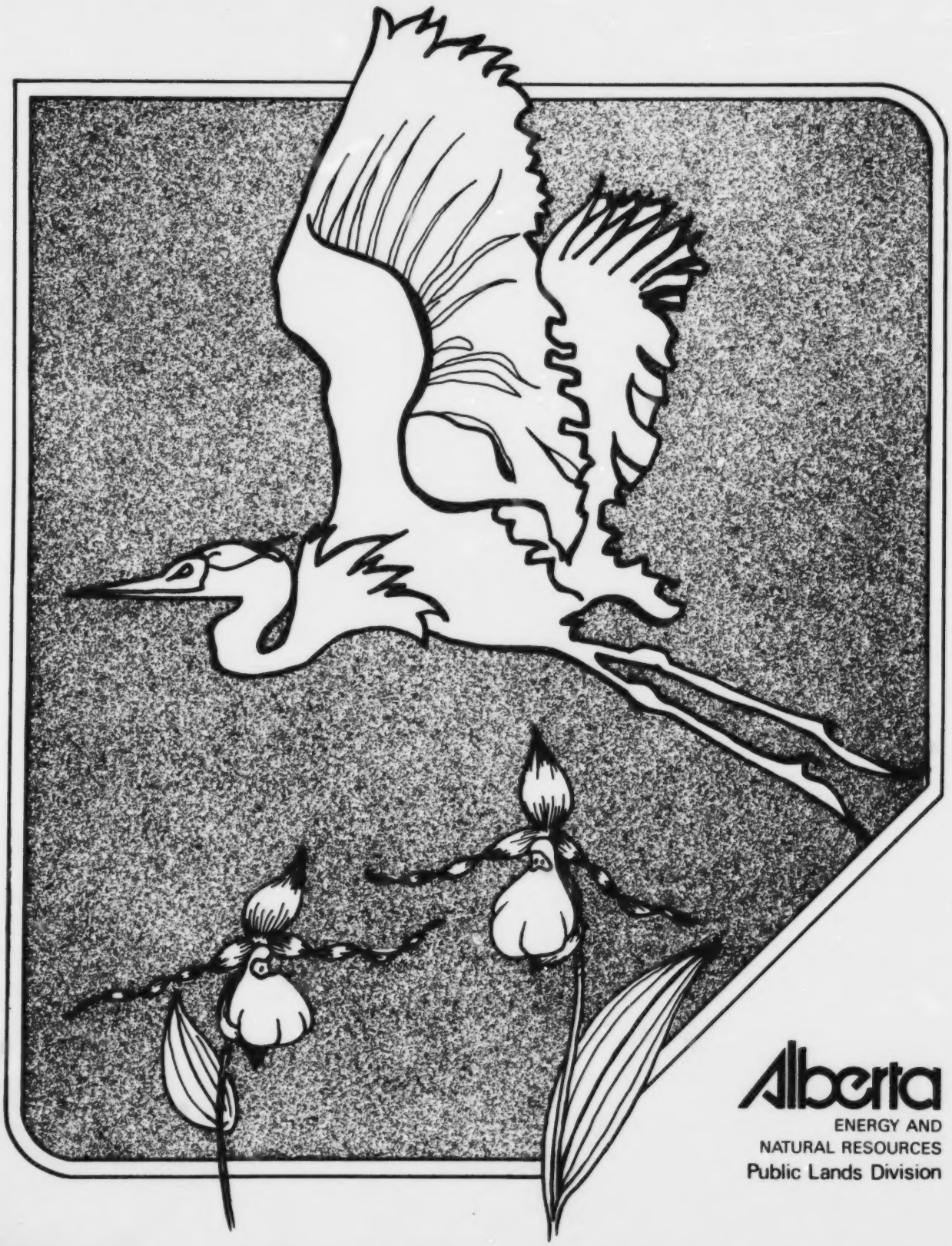
SILVER VALLEY

Biophysical Resource Analysis



Alberta

ENERGY AND
NATURAL RESOURCES
Public Lands Division

PLEASE NOTE

The views and recommendations expressed in this report are those of the author and not necessarily those of the department.

SILVER VALLEY

Biophysical Resource Analysis

by

J. Rintoul

1985
Edmonton

Alberta
ENERGY AND
NATURAL RESOURCES
Public Lands Division

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ABSTRACT

The Silver Valley site is noted as an area with excellent examples of vegetation communities representative of the Peace River Parkland Natural Region. This report summarizes the biophysical information that was obtained from a detailed literature review and a field study of the Silver Valley study area.

Ungrazed slope and level grassland and shrubland communities, mature alluvial white spruce and mixedwood stands and representative slump features are among the resource features that make the Silver Valley site worthy of protection.

Recommendations to protect the site include consideration for formal conservation status and restriction of surface access and livestock grazing.

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1. INTRODUCTION

The Peace River Parkland is one of three sections of the Parkland Natural Region, which is one of seven natural regions in the province (Map 1). The characteristic landscape pattern of this section is broad, gently undulating plains with scattered, minor uplands and deeply incised, steep-sided river valleys.

Three separate areas are included in the Peace River Parklands Section; the largest (630 000 ha) is in the Peace River area and runs from the B.C.-Alberta border to the town of Peace River. The total amount of land included in the Peace River Parkland Section (1.2 million ha) is less than two per cent of the land mass of the province (Lee and MacIsaac 1981).

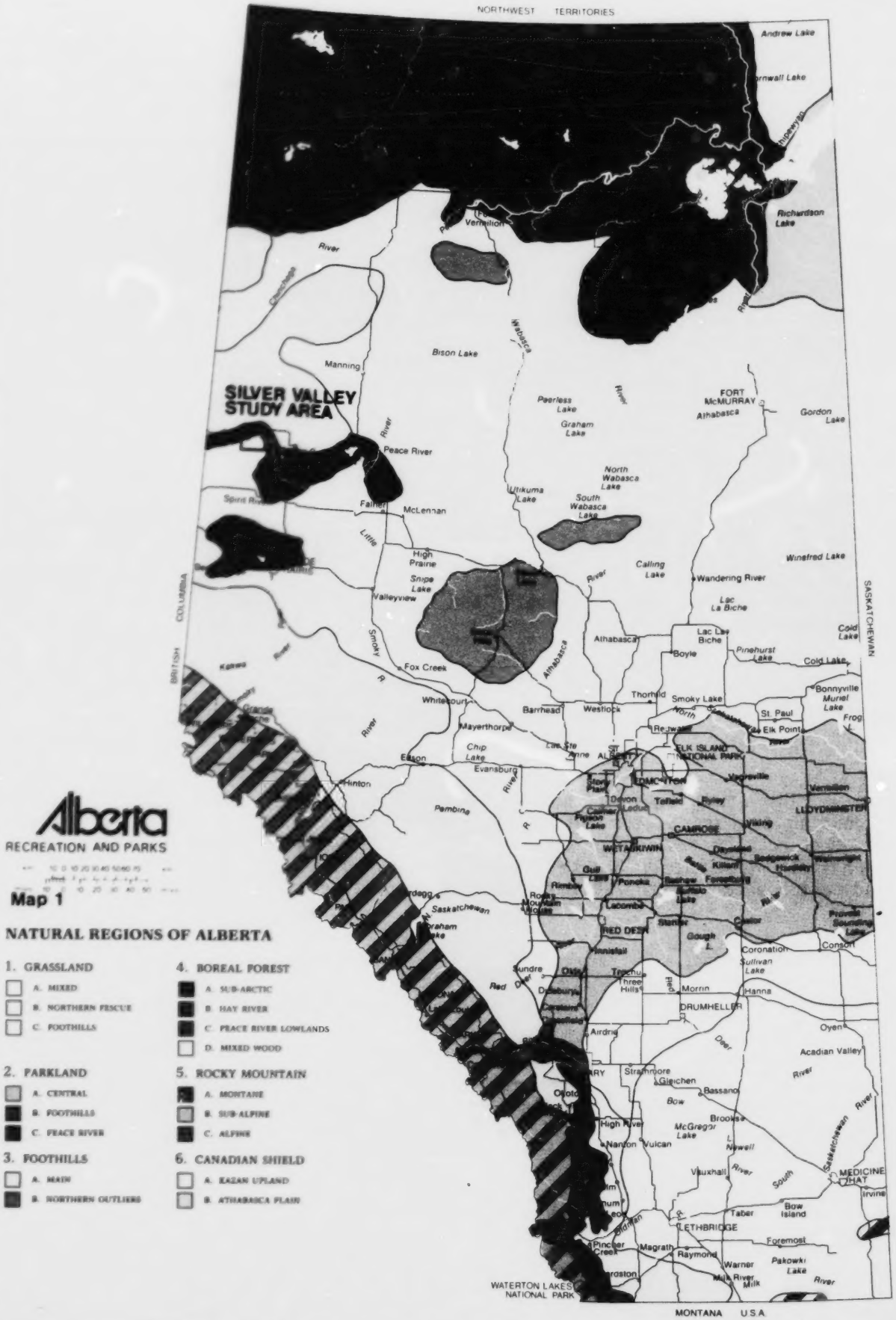
Much of the native vegetation in this section has been altered, mainly by cultivation and grazing. Of the three Parkland Natural Region sections, the Peace River Parkland is the most affected (Cottonwood 1983).

A 1979 range survey by the Public Lands Division, Department of Energy and Natural Resources (ENR), along the Peace River identified the Silver Valley site as having the best ungrazed native vegetation (Adams 1981a). Adams recommended the site to the staff of the Natural Areas Program, Public Lands Division of ENR, for more intensive study and possible preservation (Appendix 2.1). A reconnaissance survey of the Peace River from B.C. to Dunvegan by Natural Areas staff in 1981 supported this recommendation. An evaluation of potential ecological reserve sites in the Peace River Parkland identified the Silver Valley site as having the highest ecological value (Appendix 2.2) due to its excellent diversity of vegetation communities (Cottonwood 1983).

The combination of increasing developments within the region and the scarcity of remaining native grassland vegetation resulted in the Silver Valley site receiving a high priority for a detailed biophysical analysis. Thus, the present study was initiated in the spring of 1984, with field work completed in September 1984.

The objectives of the study were to:

1) identify and describe the physical environment
2) identify and describe the biological resources
3) compile an annotated flora species list
4) compile an annotated wildlife species list
5) identify and describe special features



Prepared by Graphics, Design Branch

6) identify and map vegetation communities
7) analyze available information and data to assess quality and make recommendations concerning future protection of the site

1.1 Location

The study area is located at 56°12'N latitude and 119°35'W longitude, covering the following sections in Twp. 83 - Rge. 10 - W6 Meridian:

20 (S/river)
21-25
26 (S/river)
27 (S/river)
28 (S/river)
S35 and S36 (both S/river)

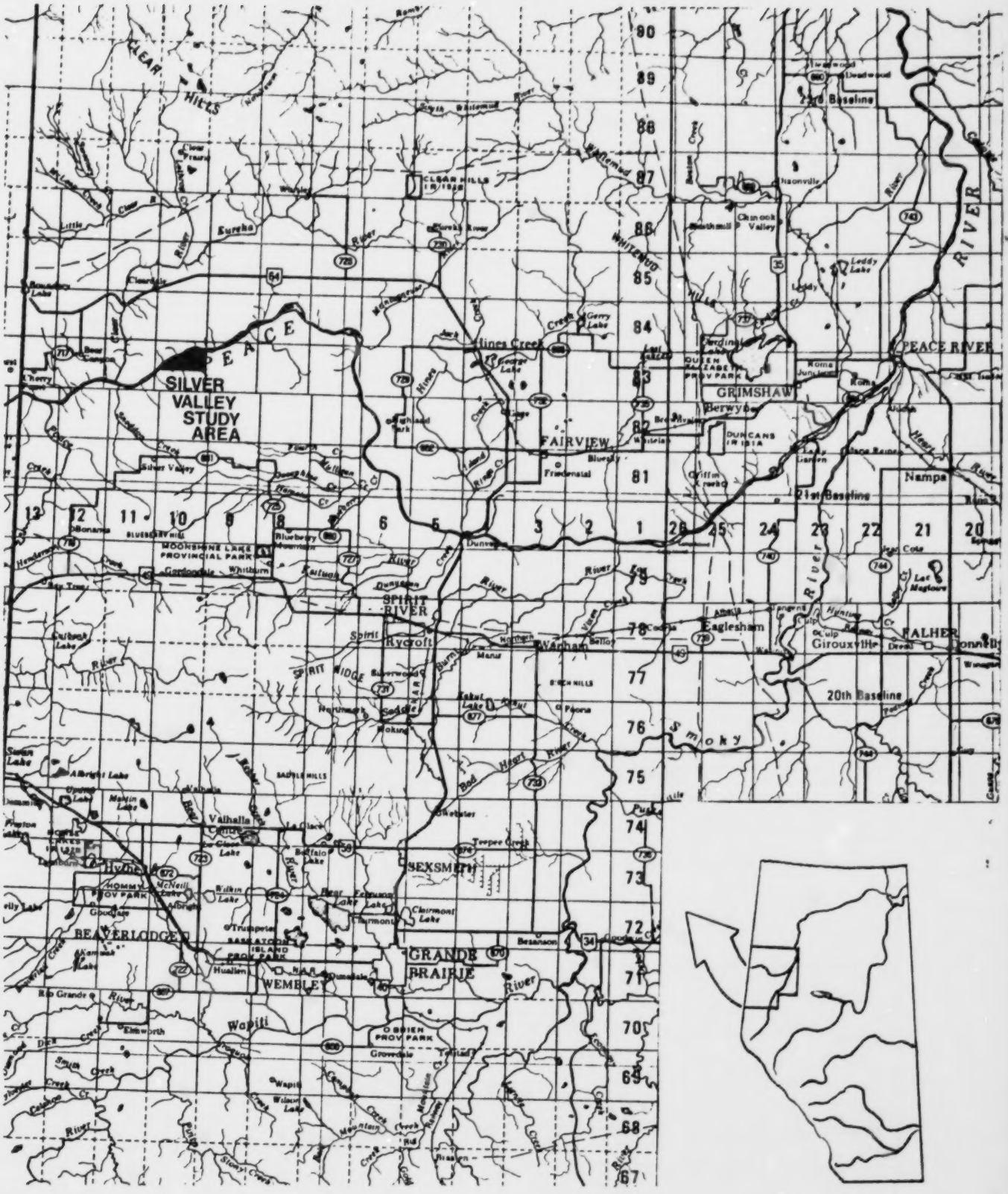
The site is situated on the south bank of the Peace River 38 km downstream from the B.C.-Alberta border and 990 km from the head of the Slave River. Other reference points include the locality of Silver Valley (15 km to the southwest) and Spirit River (62 km to the southeast) (Map 2 and Map 3).

1.2 Size

The study area encompasses approximately 1 851 ha (4 556 a.) according to Land Status Automated System (LSAS) data (Appendix 4.3). It is a roughly triangular portion of land. The Peace River forms a boundary approximately 8.9 km long on the northwest side. The south and east boundaries are 7.8 and 3 km long respectively.

1.3 Administration

The study area is currently in the O area of the Green Zone. The O area was established to provide a buffer zone between settled portions of the province and the Green Zone. It is administered for grazing purposes by the Public Lands Division of ENR.

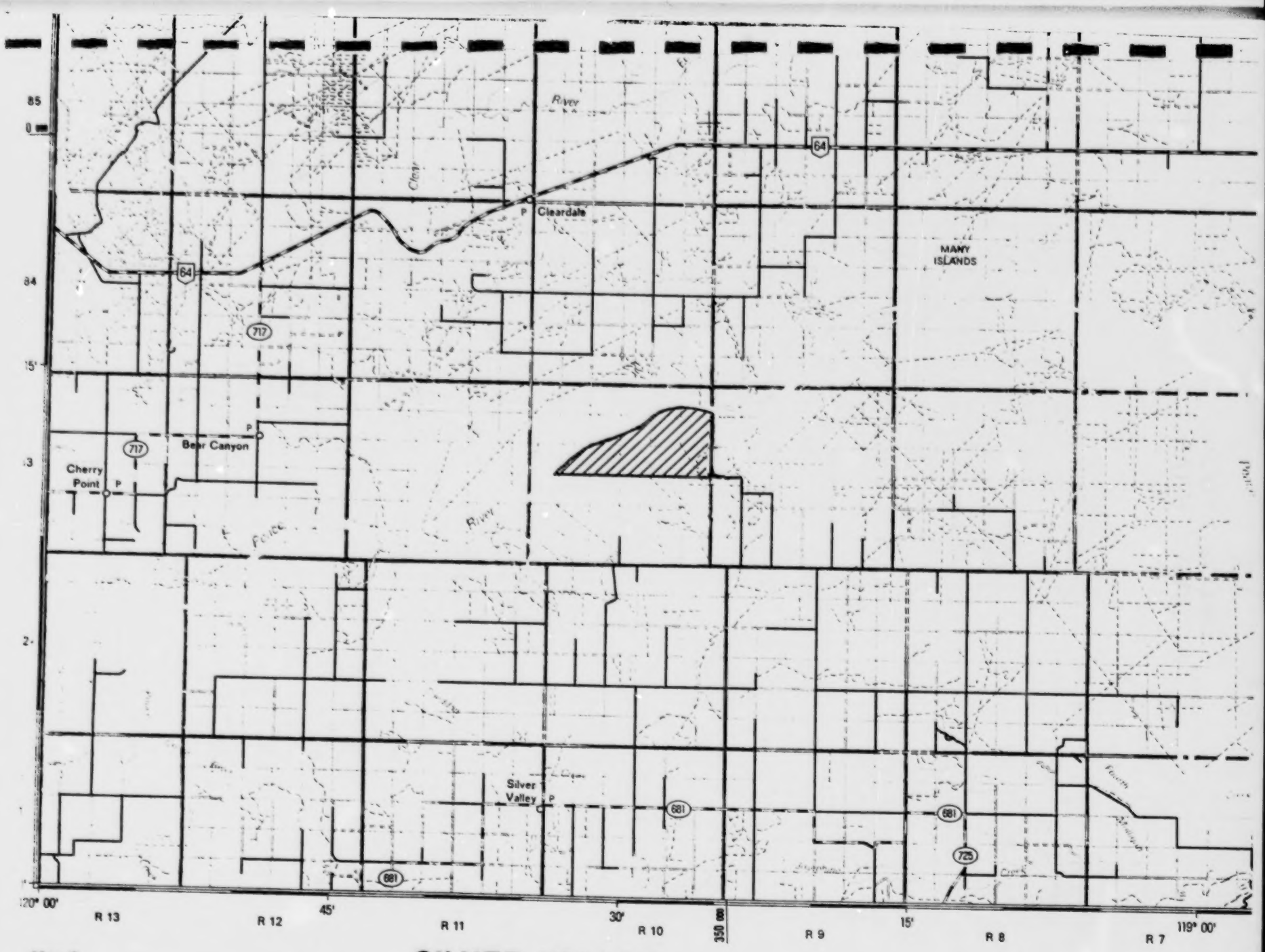


Map 2

Source : Provincial Base Map

SILVER VALLEY

REGIONAL SETTING



Map 3
Source: Provincial Access Map 84/D

SILVER VALLEY
ACCESS

Scale: 1:250,000

Currently there is a plan to phase out O areas and change the existing status to either Yellow/White or Green Zone (M. O'Byrne, Public Lands Division, ENR, Jan. 1985, personal interview). The study area has been recommended for Green Zone status, to be administered by the Alberta Forest Service (AFS). The regional land status is at present awaiting the Deputy Minister's approval.

The study area falls within the boundaries of the following government agencies:

- o Alberta Forest Service: Grande Prairie Forest
  Spirit River District (DG1)
- o Public Lands Division: Peace River Region
  Spirit River Subregion and District
- o Fish and Wildlife Division: Peace River Region
  Big Game Zone 2
  Wildlife Management Unit F359
  Grande Prairie Forest habitat biologist
- o South Peace Regional Planning Commission, Grande Prairie
- o Improvement District 20 (ID 20), Spirit River

1.4 Land Use

1.4.1 Historical

There was little early use of the Peace River valley between the B.C.-Alberta border and Dunvegan. Only a few Beaver Indians and the occasional fur trader ventured along this portion of the valley. Significant archaeological and/or historical sites have been found at the mouth of the Clear River (8 km upstream from the study area) and on gravel terraces 1.5 to 2.0 km downstream from the study area. Minor sites identified in the area generally contain scattered flakes (Appendix 4.1) (Smith 1976).

Alexander MacKenzie and David Thompson both explored this section of the Peace River in the late 1700s and early 1800s. MacKenzie noted in his diary a prominent hoodoo, which he referred to as "The Old Man", on the north side of the Peace River across from the study area in SE29-83-10-W6. However, no significant archaeological or historical sites have been located on the study site (Smith 1976).

Downstream 1.5 km from the study site is Campbell's Landing, which used to be a fording point. Albert Campbell, a local resident, has found Indian artifacts nearby. Residents on the south side of the Peace River used a trail (presently overgrown) through the east portion of the study area (Sec. 24, 25-83-10-W6) to gain access to the river to haul water (Campbell, Silver Valley area resident, July, 1984, personal interview).

1.4.2 Current and Potential

Most of the study area is classified as potentially productive forest (Alberta Energy and Natural Resources, Forest Service 1977). It is covered in regenerating aspen, because a large-scale fire swept through the region in 1936 (Adams 1981b). Most of it is Canada Land Inventory (CLI) Class 5-7 for the production of white spruce (Appendix 4.2) with limitations due to moisture deficiency and exposure. A small area (CLI Class 4 for white spruce with limitation due to moisture excess) of mature white spruce occurs on the small terrace in N25 and S36-83-10-W6 but is probably not economically harvestable due to the small area and difficult access (author's opinion). A Forest Management Agreement Area (FMA), under licence to Canadian Forest Products, abuts the study area on the east side. Aspen in the FMA area is being utilized in the production of chipboard at Grande Prairie (O'Byrne, Public Lands Division, ENR, Jan, 1985, personal interview).

The only portion of the study area that is suitable for agricultural production is the small parcel of tableland in SE24-83-10-W6. This land is Priority II agriculture land with moderate to severe limitations (Alberta Energy and Natural Resources, Resource Evaluation and Planning 1983). Reeder and Odynsky (1965) rate this land fairly good to good arable. The remainder of the study area is unsuitable for agricultural crops due to rough or broken topography. Public Lands Division has a fragile slope hazard reservation (PNT0120) (Appendix 4.3) on all of the study area.

Much of the land within 10 km of the south boundary of the study area has been cleared for agricultural purposes since the mid-1960s. Clearing is expected to continue as the land is in the Yellow Zone and may be available for agricultural disposition.

Although there is no record of stock grazing on the study area, there is a 1976 application on file for a grazing lease covering much of the area (Alberta Energy and Natural Resources, Public Lands n.d.) (App. GRL14949). No approval for this application is contained in the file. It is assumed therefore that no grazing lease was ever issued.

Much of the land to the south of the study area is posted for grazing lease or permit (GRL, GRP) or for farm development leases (FDL) or is patented.

The study area is included in a registered trapline. However trapping intensity is low and restricted to areas immediately adjacent to the Peace River (Myers, Public Lands Division, ENR, Jan, 1984, personal interview).

Past petroleum and natural gas activity on the study area has been limited to seismic cutlines, most of which are on the tableland. The Shaftesbury Formation underlies the study area and is a natural gas bearing zone (Monenco 1976); however, the rough topography will probably limit drillsites to the tableland.

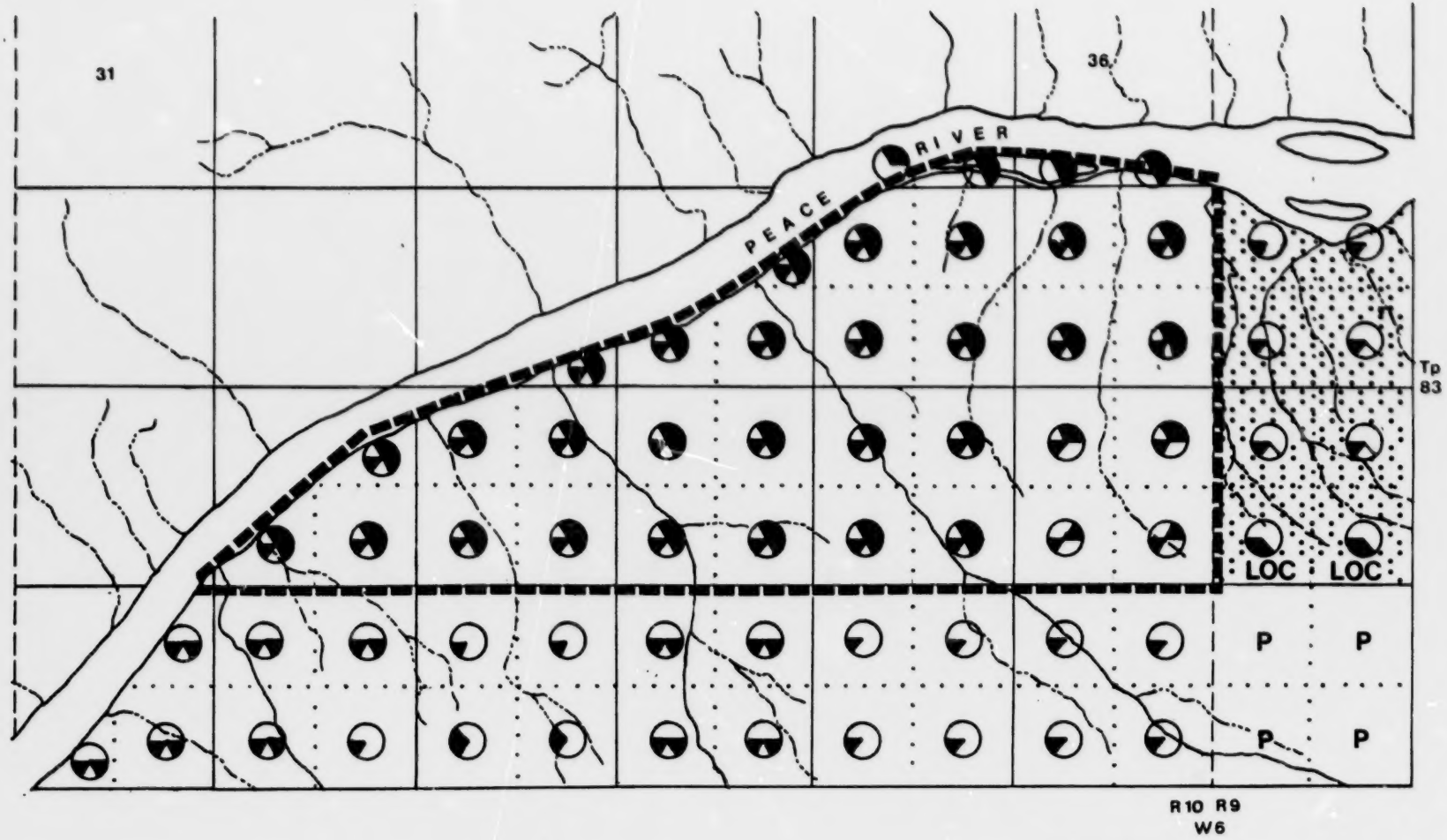
There are three abandoned and one active wellsite within three kilometres of the south and east boundaries of the study area. A gas plant is situated in Sec. 12-83-10-W6. A major gas field (Josephine Creek) extends into the southeast corner of 83-10-W6 and abuts the study area (Stelck and Storer 1976).

There are no surface materials extraction activities in the study area. The closest gravel pit is 1.5 km west of the mouth of Sneddon Creek (9 km upstream from the study area). No deposits have been identified on the study area.

All of the study area is under consultative notation (CNT0560.) (Appendix 4.3) to Alberta Environment for water management purposes, which reserves the right of access to construct dam-related works. The proposed Dunvegan Dam on the Peace River would flood a small portion of the study area. In recent years this dam proposal has been downgraded in priority; Slave River dam proposal has taken precedence.

Boaters, canoeists and kayakers use this reach of the Peace River for recreation. Fire rings are built at informal stopover points on gravel/cobble deltas at the mouths of the major creeks and on the remnant island. Use of these areas was noted during the field work for this study. A few hunters, usually bear hunters, may use the site. ATV (all terrain vehicle) use was noted along the cutlines on the tableland portions of the study area. The lower valley slopes along the Peace River are rated CLI Class 4 and the upper slopes and tableland Class 5 for recreation purposes with sites suitable for organized camping, viewing of wildlife, hiking, nature study, aesthetic appreciation and water access (Appendix 4.2).

Improvement District 20 (ID 20) has had a recreation potential reservation (CNT0323.1) (Appendix 4.3) on the study area (Map 4) and adjacent lands since December 20, 1982 (expires December 20, 1987).



Map 4

SILVER VALLEY

LAND DISPOSITIONS & RESERVATIONS

Scale 1:50:000

Miles 1 0 1

Km 1 0 1

N

Reservations

Environment NOT

Watershed PNT — Ecological Reserve PNT

Recreation Area CNT — Fragile Slope PNT

Heavy Timber PNT

LOC Licence of Occupation

P Patented Land

Forest Management Agreement Area

2. PHYSICAL RESOURCES

2.1 Bedrock Geology

Much of the following information on bedrock geology is based on Camsell and Malcolm (1921), Jones (1966), Mollard (1975), Ozoray (1982) and Nelson (1984).

The study area is underlain by several Cretaceous strata (Mesozoic) that dip gently to the southwest towards the Alberta syncline. In the Peace River region, beds generally thicken toward the southwest but some also thicken to the west and northwest.

The Peace River region was the only part of the province that was covered by sea during the Triassic. This resulted in a complex interlensing of beds and a variety of sedimentary rocks.

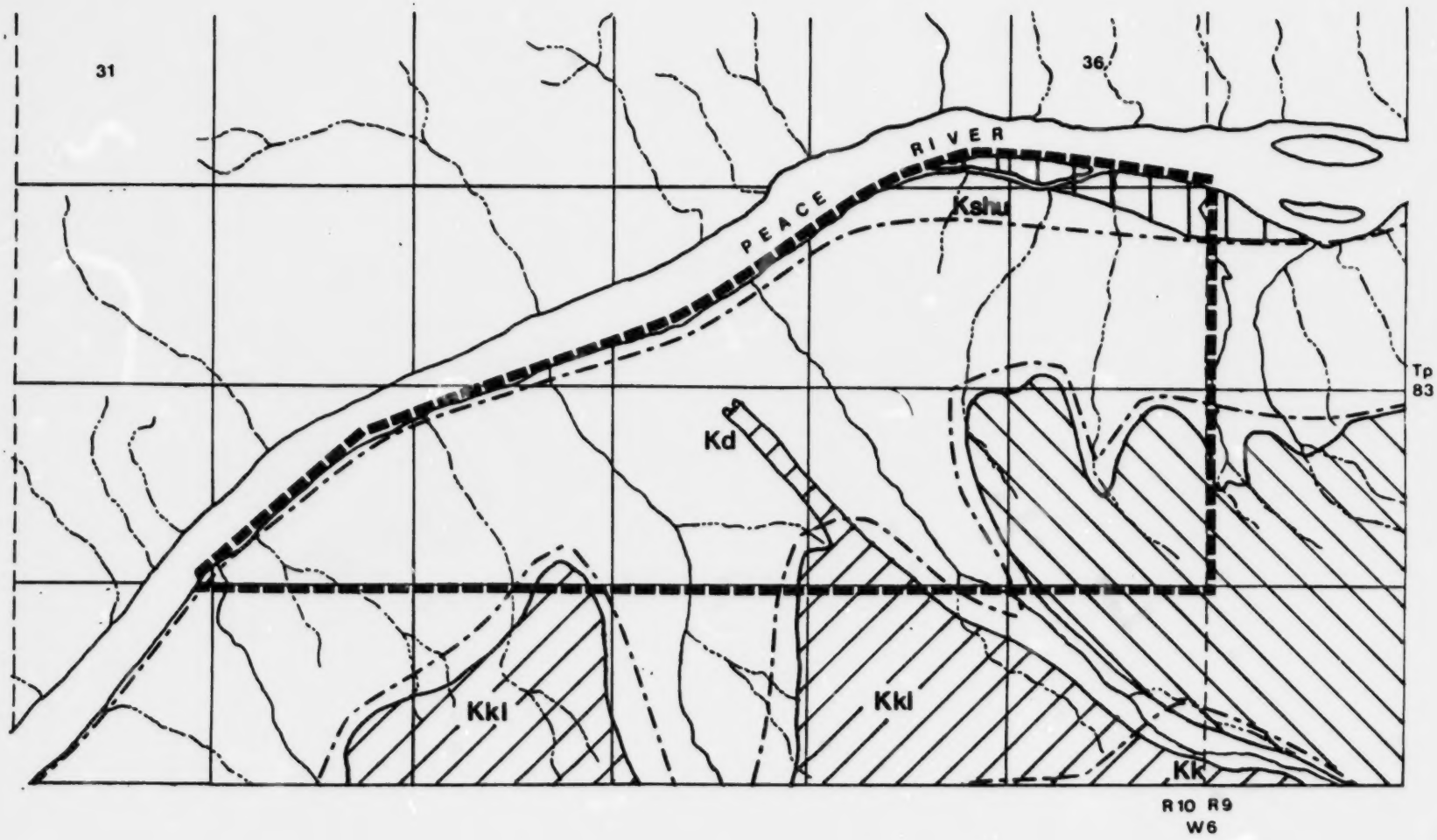
As the strata rebounded from overconsolidation by glaciation, lateral swelling and gradual downgrading of the valley slopes occurred. Bedrock is exposed by the postglacial incision of the Peace River and also by slumping along valley sides.

The lowermost strata exposed in the study area is the upper member of the Shaftesbury Formation, formerly Fort St. John. This formation is composed of dark grey fish-scale-bearing shale, silty in the upper part with numerous nodules and thin beds of concretionary ironstone and bentonite partings. The base of the fish-scale sand bed is commonly used as the Lower-Upper Cretaceous boundary, because it is easily identified on electric logs. Ozoray (1982) indicates that only the upper member of the Shaftesbury Formation outcrops along the Peace River (Map 5) in the vicinity of the study site. An outcrop of Shaftesbury shale was observed during the present study. The Shaftesbury Formation regionally thins towards the east and south.

The Shaftesbury Formation is susceptible to large-scale gravity creep movements. This strata has repeatedly failed in postglacial times and additional failure is expected, although at a slower rate and in a less-widespread area.

The Shaftesbury shales are a natural-gas-bearing zone in the Peace River region (Monenco 1976).

The Dunvegan Formation overlies the Shaftesbury. It is composed of grey fine-grained feldspathic sandstone with hard



Map 5

SILVER VALLEY
BEDROCK & SURFICIAL GEOLOGY

Scale 1:50:000

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Km 1 0 1

N

BEDROCK GEOLOGY

- Formation Boundary
- **Kshu** Shaftesbury Formation
- **Kd** Dunvegan Formation
- **Kkl** Kaspapau Formation (lower member)
- **Kk** Kaspapau Formation

SURFICIAL GEOLOGY

Worsley Plain Subregion
- Peace River Fluvial
- Peace River Colluvial
- Glaciolacustrine
- Glaciolacustrine Till

calcareous beds, laminated siltstone and grey silty shale resulting in a stronger strata than the underlying Shaftesbury. Marine beds from the east interfinger with continental beds from the west. Stelck and Wall (Jones 1966) state that the Dunvegan sands were the outer margins of a delta that skirted an upland centred on the southern MacKenzie and Cassiar Mountains of B.C. The downwarping effect of the Alberta syncline results in the Dunvegan sandstone being brought down to water level along much of the Peace upriver from Dunvegan (Stelck and Storer 1976). Regionally the Dunvegan strata thins to the southeast.

The Dunvegan Formation weathers to castellated forms. This is more apparent downstream (Montagneuse River to Dunvegan) from the study area. A few interesting examples of bedrock shelves and rock holes occur along the tributary creeks in the study area. Most of the Dunvegan outcrops occur on the north side of the Peace and are prominent across the river from the study site.

Overlying the Dunvegan strata is the Kaskapau Formation, composed of marine dark grey silty shale with ironstone partings. Where a lower member is separable there are also fine grained quartzose sandstone and thin beds of ferruginous oolitic mudstone interbedded with the above.

The Kaskapau Formation regionally thins eastward from the B.C. border. The structure contour on top of the Kaskapau Formation (lower member) and the Dunvegan Formation is defined at 545 m amsl (above mean sea level), which is approximately 61 m below ground surface tableland on the study area.

The Kaskapau strata is slide prone and subject to large-scale gravity creep movements that are continuing at a slower rate and are less widespread than during previous postglacial times. The upper contact zone is often weathered to highly plastic, soft clay that is subject to slumping.

2.2 Surficial Geology

The major sources for the following description of the surficial geology is based on Mollard (1975), Stelck and Storer (1976), and Lorberg and de la Cruz (1981).

Mollard (1975) shows the position of an inferred major preglacial valley underlying the study site and paralleling the present Peace River, although Lorberg and de la Cruz (1981) only identify a buried valley (Shaftesbury) in the vicinity of the study area north of the present Peace River. The sands and gravels deposited in the buried valleys overlay bedrock strata and are of preglacial origin. Mollard (1975) states that the inferred preglacial valley location appears to correspond to the areas with the greatest intensities of slope

failure. The estimated valley width is three to four kilometres at the bottom and nine kilometres or more at the top (Mollard 1975).

A variety of glacial drift (Map 5) of Pleistocene and Recent ages covers the buried valleys and bedrock strata. These deposits generally decrease in thickness from the valleys to the uplands. The presence of Quaternary fill almost to the valley floor indicates the antiquity of the valley.

Glacial till in the form of ground moraine generally underlies glaciolacustrine and glaciofluvial deposits (Tedder 1981). Van Waas (1978) shows till occurring near and on the study site in NE13 and Sec. 24-83-10-W6. The till is dense and clay-rich (Mollard 1975) and is more clayey than that found around Edmonton and east-central Alberta (Jones 1966).

Glaciolacustrine deposits (sand, silt, clay) cover most of the upland areas. These deposits originate from the ice-dammed Lake Peace, which was confined to the Peace River basin. Lake Peace drained eastward before its incorporation into glacial Lake Tyrrell (Taylor 1960). In the vicinity of the study area, glaciolacustrine deposits are confined to the level upland (Van Waas 1978). These deposits are the parent material for some of the best soils in the region.

Alluvial-terrace and slump-colluvial deposits are of recent origin.

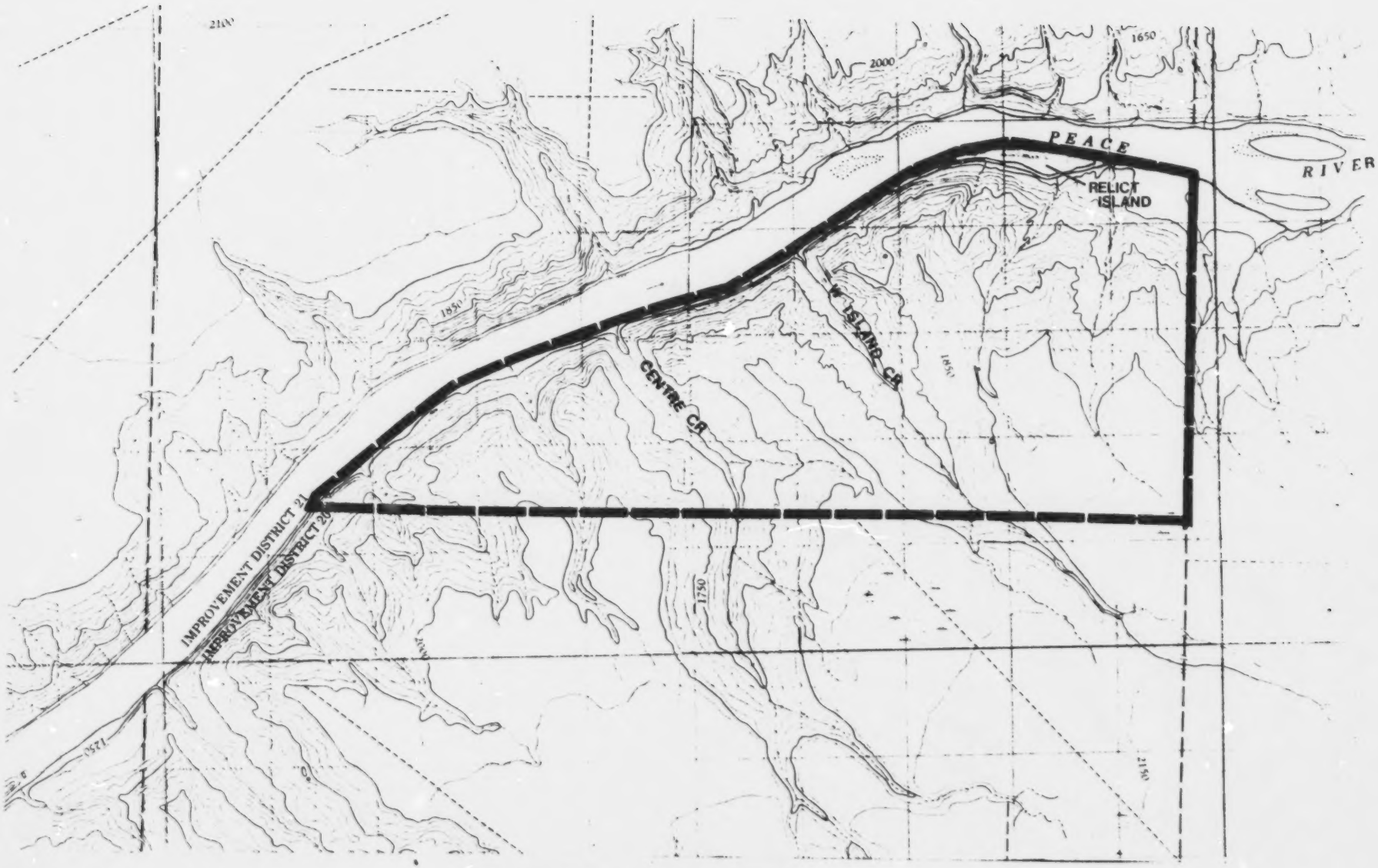
Alluvial deposits are generally thin (less than five feet) and composed of overbank silt, clayey silt and fine sand on top of coarser sands, gravels and boulders. Due to river erosion or lack of deposition of finer particles, coarser materials are exposed as bars and occur on the channel bed. The channel bed is composed of 6-81 m of gravel over soft, cohesive and easily erodible bedrock (Kellerhals, Neill and Bray 1972).

In the study area, alluvium occurs along the river at the creek mouths and at the relict island and the terrace adjacent to it in S36 and NE25-83-10-W6.

Slump and colluvial debris cover most of the steep slopes. This material is composed of varying mixtures of bedrock and glacial drift and forms veneers, mounds and fillet-like piles. This type of deposit covers the majority of the study area (Tedder 1981).

2.3 Topography and Hydrology

The major portion of the study site is composed of the valley slopes of the Peace River and tributary creeks (Map 6). There are three permanent and seven ephemeral creeks. The permanent creeks are about 3.8 and 8.5 km long and none are entirely contained within the



Map 6

SILVER VALLEY

TOPOGRAPHY & HYDROLOGY

CONTOUR INTERVAL 50 ft

Scale 1:50000

Source: N.T.S. 84/D3, 84/D4

study area. They flow generally either north or northwest and drain a small plateau. The plateau is approximately 6 km wide and 10 km long. It is at 710-740 m asl, roughly paralleling the Peace River, and is set back approximately 9 km from it. The plateau is drained in other directions outside the study area by tributaries of the Peace River (Sneddon, Fourth and Josephine Creeks).

The Peace River valley is from 1 to 2 km wide and 235 to 265 m deep at the study site (from 1:50 000 NTS map). The top of the embarkment is at approximately 605 m amsl on the right (south) bank and 635 m on the left (north) bank. The river itself is at 370 m amsl (from 1:50 000 NTS map). The total relief is 255 m. A longitudinal profile (Appendix 5.1) of the Peace River valley (Kellerhals, Neill and Bray 1972) shows that the study site occurs near the deepest portion of the Alberta section of the Peace River valley. The deepest location is approximately 15 km downstream where it is 30 m deeper on the left bank.

There are a diversity of slopes (degree and aspects) at the study site. Slopes along the Peace River are generally north-facing and strongly inclined. Aspects of the tributary creek valleys are mainly east and west-facing with south facing slopes near the creek mouths. The steepest slopes (greater than 10 per cent) occur mainly on the tributary creeks where they cut through the abutment of the Peace River slopes with their own valley slopes.

Gauging stations on the Peace River at Taylor, B.C. (88 km upstream) and Dunvegan (92 km downstream) indicate a mean discharge rate of between 1 465 and 1 586 cubic metres per second (cm/s) (min. 170 to 1 952 and 539 to 1 961 cm/s; max. 11 615 to 1 948 and 11 076 to 1 964 cm/s respectively). Freeze-up generally occurs between October 23 and December 28 (mean of November 22 at Taylor). Break-up occurs from the beginning of April to early May (Kellerhals, Neill and Bray 1972).

Other than a few seepages on the bedrock exposures along the Peace River valley slopes, no springs were noted during field work in the study area. Ozoray (1982) does not identify any springs in the vicinity.

Groundwater potential and acquifer characteristics for bedrock and surficial deposits found in the study area are given in Appendix 5.2.

Small areas of surface water exist in slump impoundments, some of which have been dammed by beaver. A seasonal surface water body is impounded in the abandoned channel adjacent to the relict island.

2.4 Geomorphic Systems and Soils

The study area is located in the Worsley Plain subregion of the Peace River Lowland Physiographic Region. This plain is of very low relief (424 m-697 m) and deeply incised by the Peace River. Three of the subregion's geomorphic systems -- Glaciolacustrine, Peace River Colluvial and Peace River Fluvial -- are represented at the study site (Map 5) (Tedder 1981).

2.4.1 Glaciolacustrine

The glaciolacustrine system only occurs in the study area on SE24-83-10-W6. It is a level-to-undulating plain (0-5 per cent slope) composed of sediments with a stone content of less than one per cent deposited by proglacial Lake Peace. The parent material is grey-to-dark grey, moderately calcareous saline clay (Reeder and Odynsky 1965). Dark Gray and Gray Solods are the predominant soils although Dark Gray Luvisols may be present. Textures are mainly clay loam and silt loam (Tedder 1981). A land appraisal report (Appendix 5.4) for Sec. 24-83-10-W6 identified the presence of clay-textured grey wooded (Luvisol) soils. Appraisals (Appendix 5.4) on land in the same geomorphic system outside the study area also noted grey-wooded and solodic grey wooded soils. Reeder and Odynsky (1965) map the soils in this system in the vicinity of the study area as grey wooded and dark grey solods of the Nampa and Fahler Series. These soils are imperfectly drained and rated as fairly good to good arable. This system was not sampled for soil analysis during a reconnaissance survey for this study (Appendix 5.3).

2.4.2 Peace River Colluvial

This system is characterized by extensive slope failures, gullying and mass wasting of the glacial deposits along the bedrock-controlled slopes (Tedder 1981). Several types of slope failure features have been identified by Mollard (1975) including deep-seated failures, half-bowl failures, second generation slides, half-cone shape failures, failure cavities, thumbprint failures, talus and near surface slides and debris avalanche tracks. Most of the study area's slopes have large, relatively deep-seated slope failures. There are two areas exhibiting half-bowl-shaped failure craters. The north-facing slopes along the Peace River have frequent large gullies and ravines (Mollard 1975).

Surficial deposits are composed of glaciolacustrine sediments and till that are frequently mixed in slope failure debris. Bedrock outcrops are common (Tedder 1981).

The upper slopes are inclined (30-70 per cent slope), and terracettes, mass wasting and gullying are common. Soils are mainly well to moderately well drained Orthic Eutric Brunisols and Orthic Regosols (clay loam, loam and silt loam texture). South-facing slopes are grass covered and drier than the aspen-covered slopes where mass wasting is most common (Tedder 1981).

The failed slopes (6-70 per cent slope) have inclined and hummocky surfaces. Grassed areas are generally on moderately well to well drained Orthic Eutric Brunisols and Orthic Regosols. Occasionally Solonetzic Black and Orthic Black Chernozems may be present. Treed areas have Solonetzic Gray Luvisols, Eluviated Eutric Brunisols and Orthic Eutric Brunisols.

The steepest bedrock-controlled slopes (31 to more than 70 per cent) have a veneer or blanket of colluvium that is subject to mass wasting. Soils are restricted to Orthic Regosols and Orthic Eutric Brunisols that are well to rapidly drained (clay loam, sandy loam texture) (Tedder 1981).

Bedrock exposures have steep slopes approaching and above 100 per cent (Tedder 1981).

2.4.3 Peace River Fluvial

The floodplain and adjacent terraces of the Peace River compose this system. The floodplain in the study area is very narrow (0-10 m) and consists of gravels and cobbles in a sandy matrix, often overlain by silt. Small deltas of similar composition but without the silt overburden have built up at mouths of larger tributary creeks. A small terrace occurs just east of the relict island, but the channel between it and the mainland is abandoned. The soils of this system are restricted to Orthic Regosols and Cumulic Regosols with clayey-to-sandy texture (Tedder 1981).

3. CLIMATE

The study area has a moderate, continental climate with moderately warm summers and relatively cold winters (Brocke 1972). The nearest climatological station with long-term weather data is Cleardale, situated approximtely 15 km northwest (56°19'N 119°29'W) at 671 m elevation (Table 1). The mean annual daily temperature is -0.6°C (January -20.7°C, July 14.7°C) with total mean precipitation of 441.2 mm. The average frost free period is 73 days (Canada Department of the Environment 1982). Prevailing winds (data available only for Fairview) are from the northwest at 11.2 km/hr. The monthly mean wind speeds vary little: 10.1 to 13.3 km/hr. Winds are generally from the west and northwest except during February, March and April when they tend to be from the east (Canada Department of the Environment 1982).

Analysis of selected provincial climatic data maps (Masterton, Crowe and Baker 1976) reveals that the study area has weather similar to more central and southerly portions of Alberta. The mean daily maximum temperature in May and August is warmer than the surrounding area and similar to that found in central Alberta. Similarly the mean duration of frost free days and the dates of last spring and first autumn frosts are close to values found in central Alberta. The growing season's (May-September) mean precipitation is similar to the values for east-central Alberta.

The agro-climatic zone (2H) is the same as parts of central and southern Alberta (Bowser 1967).

Table 1

CLIMATIC DATA FOR CLEARDALE[a]

56°19'N 119°29'W 671 m

	Temperature (°C)					Precipitation (mm)		
	Mean			Extreme				
	Daily	Max.	Min.	Max.	Min.	Rain	Snow	Total
Jan	-20.7	-14.2	-27.2	8.9	-51.1	0.7	27.4	31.2
Feb	-14.5	-7.2	-21.8	11.1	-46.1	0.1	23.0	25.1
Mar	-8.9	-1.4	-16.3	14.4	-42.8	0.9	25.6	29.8
Apr	1.5	8.2	-5.2	28.9	-30.0	5.1	10.3	16.3
May	9.0	16.5	1.5	30.0	-8.3	40.7	1.6	42.4
Jun	12.6	20.1	5.2	32.2	-2.2	60.6	0.1	60.7
Jul	14.7	22.1	7.2	32.2	-1.1	72.9	0.0	72.9
Aug	13.4	20.8	5.9	32.2	-3.9	50.0	0.4	50.4
Sep	8.3	15.4	1.1	30.0	-20.0	32.2	1.8	34.3
Oct	2.6	9.1	-4.0	25.0	-24.4	11.4	10.0	21.4
Nov	-8.2	-2.6	-13.7	15.6	-42.2	3.6	21.7	29.1
Dec	-16.5	-10.5	-22.4	8.0	-47.8	0.1	25.2	27.6
Year	-0.6	6.4	-7.5	32.2	-51.1	278.3	147.1	441.2

Frost Free Data

Average Length: 73 days Longest: 108 days Shortest: 13 days
Mean Date of Last Spring Frost: Jun 10 First Fall Frost: Aug 23
Earliest-Latest Extremes
Last Spring Frost: May 28 - Jul 7 First Fall Frost: Jul 21 - Sep 21

SOURCE: Canada Department of the Environment (1982)

NOTE: [a]Nearest climatological station to the study area.

4. VEGETATION

4.1 Flora

4.1.1 Vascular Plants

A total of 183 vascular plant species (Appendix 6.2), comprising 120 genera and 51 families, have been identified at the Silver Valley study area. Compositae (29 species) and Gramineae (28 species) are the most diversely represented families. Other well-represented families include Rosaceae (14 species), Ranunculaceae (9 species) and Leguminosae (8 species). Carex is the most diverse genera (7 species). Other well-represented genera include Equisetum and Aster (5 species each), Stipa, Salix and Artemisia (4 species each).

There are eight species that are classified (Moss 1983) as introduced (Appendix 6.2).

One rare species (Stellaria crispa) has been identified in the study area (Packer and Bradley 1984).

4.1.2 Nonvascular Plants

Only 23 mosses (15 families) and 11 lichens (3 families) (Appendix 6.2) were identified for the study area. The only moss genera present with more than one species was Drepanocladus. Cladoniaceae (9 species) is the most diverse lichen family present.

4.2 Vegetation Overview

As the study area is situated on the edge of the Peace River Parkland section (adjacent to the Boreal Mixedwood), it possesses diverse vegetation communities with influences from both sections. Forested and grassland communities dominate with only minor amounts of wetland present (Map 8). A mature white spruce forest exists on a small alluvial terrace in the northeast part of the study area. The relict island just to the west of this terrace is covered by a mixture of mature balsam poplar, white birch and white spruce. All of the area

except for the relict island and the alluvial terrace was burned over in 1936 (Adams 1981).

Alluvial and lower north-facing slope forest community types identified are White Spruce - Horsetail (Picea glauca - Equisetum), White Birch - Horsetail (Betula papyrifera - Equisetum), Balsam Poplar - Low-bush Cranberry - Wild Sarsaparilla (Populus balsamifera - Vibernum edule - Aralia nudicaulis) and Balsam Poplar - Red-osier Dogwood (Populus balsamifera - Cornus stolonifera). These community types cover approximately 30 ha or 2 per cent of the total study area.

The major portion of the study area (70 per cent; 1 300 ha) is covered by a maturing aspen/shrub forest with occasional mixedwood stands. These occur on valley slopes of the Peace River and on several small permanent and ephemeral creeks. An area of level upland covered with aspen/shrub occurs in the south part of the study area, and a small area of aspen - pine forest (8 ha) in the extreme southeast corner.

Major slump complexes cover about 112 ha and support rolling aspen forests alternating with small depressional wetlands.

Five aspen forest community types were identified: Aspen - Rose - Herb (Populus tremuloides - Rosa - herb), Aspen (Lodgepole Pine) - Buffaloberry - Rose - Hairy Wild Rye (Populus tremuloides (Pinus contorta) - Shepherdia - Rosa - Elymus), Aspen - Buffaloberry - Rose - Hairy Wild Rye - Bluebell (Populus tremuloides - Shepherdia - Rosa - Elymus - Mertensia), Aspen - Willow - Buffaloberry - Reed Grass (Populus tremuloides - Salix planifolia - Shepherdia - Calamagrostis) and Aspen (Lodgepole Pine) - Willow - Reed Grass (Populus tremuloides (Pinus contorta) - Salix bebbiana - Calamagrostis).

Shrubland community types on slopes include Buffaloberry - Rose - Hairy Wild Rye (Shepherdia - Rosa - Elymus), Saskatoon - Rose (Amelanchier - Rosa) and Saskatoon - Buffaloberry - Dogbane (Amelanchier - Shepherdia - Apocynum). Due to the difficulty in delineating these shrublands on air photos no estimate of area covered is given.

Wetland vegetation covers only 8 ha or 0.5 per cent of the study area and is limited to isolated slump impoundments and depressions dammed by beavers. An abandoned channel exists between the relict island and the true shoreline. Small shrublands exist around the perimeter of these wetlands and along the narrow alluvial floodplain and terrace of the Peace River.

Wetland community types include Red-osier Dogwood - Rose - Horsetail (Cornus stolonifera - Rosa - Equisetum), Sedge - Bulrush (Carex - Scirpus), and herb meadow, temporary sloughs, and alluvial shoreline.

Moss (1952) characterized the grasslands of the Peace River region as an Agropyron - Stipa - Carex (AG-ST-CA) association, that varied floristically according to climatic and edaphic conditions. The

prevailing climax grassland, an Agropyron - Stipa (AG-ST) faciation, occurs on mesic, flat-to-rolling terrain. Dry, steep south-facing slopes support a Stipa faciation, and low moist areas an Agropyron - Carex (AG-CA) faciation.

Moss (1952) reported that the AG-ST-CA association closely resembled the grasslands of Wood Buffalo National Park (Raup 1935), especially the AG-CA and AG-ST faciations. There is also a close resemblance, except for the absence of Festuca scabrella, between the Peace River grasslands and those of south-central and southwest Alberta (corresponding to the Foothills and Northern Fescue Grassland Sections) (Appendix 6.1).

Due to the presence of Stipa spartea and Agropyron dasystachyum in Peace River grasslands, Coupland allies these grasslands with the Mixed Grasslands of southern Alberta (Wallis 1982). There is more floristic differences between Peace River and Mixed Grasslands than any two Mixed Grassland types (Wallis 1982). Stipa spartea is a major grass in fescue grasslands and Wallis (1982) supports Moss in allying the Peace River grasslands with the fescue grasslands. Wroe (1971), in discussing the synecology of Festuca scabrella, suggests that a Stipa spartea - Artemisia frigida association of this grassland is similar to Coupland's Stipa - Bouteloua and Stipa - Agropyron mixed grassland associations.

Wilkinson (1981), in a major survey of Peace River grasslands, identified two grassland associations: Carex - Danthonia - Stipa (CA-DA-ST) and a Stipa - Carex - Artemisia (ST-CA-AR) type. Wilkinson states that these are analogous to Moss' AG-ST and ST faciations respectively. Wallis (1982) suggested changing Wilkinson's CA-DA-ST to a Agropyron trachycaulum - Stipa spartea - Danthonia - Carex association, which is the edaphic climax on solonetzic soils. Stacey's (1927) Upland grass (Poa - Agropyron) and Koeleria - Agropyron communities are similar to Wilkinson's CA-DA-ST and ST-CA-AR community types.

Comparison of the Silver Valley grassland sites (topography) with Moss and Wilkinson's site types suggest that these grasslands belong to Moss's ST faciation and Wilkinson's ST-CA-AR community type (i.e. dry, steep south-facing slopes). However, floristically some of the grassland community types described for Silver Valley have affinities to Moss's AG-ST faciation (an edaphic climax).

Aspect, steepness of slope, depth of soil, substrate and salinity all affect species occurrence and growth (Coupland 1973). Grassland communities change rapidly when weather and climate alters (Wallis 1982). Cooler summers are favourable for increases in Agropyron cover. Agropyron is also able to thrive, unlike Stipa, in impermeable soils, which are common at Silver Valley. Additionally, Agropyron and Stipa both have higher cover on lightly grazed grasslands while heavy grazing increases sedge cover at the expense of grasses (Moss 1952). The Silver Valley site is ungrazed.

Individual grassland species occurrence and cover values are affected by climatic and edaphic factors. A review of the literature revealed the following information:

Agropyron dasystachyum	- cooler, moister, finer-textured soils - thrive in impermeable soils, lacustrine clays
Agropyron trachycaulum	- coarser soils
Stipa spartea	- moderately moist soils
Stipa viridula	- fine, heavier, moister soils, lacustrine clays - thrives where protected from wind
Stipa curtiseta	- coarser soils
Koeleria macrantha	- wide ecological amplitude
Artemisia frigida	- more common in climax communities
Opuntia fragilis	- coarse-textured soils

Due to limited soil analysis conducted during the Silver Valley study, the above general information was utilized to assist in defining community ecological relationships and to infer soil textures and moisture regimes.

The dry south- and southwest-facing slopes are vegetated with a variety of grassland communities dominated by either Stipa, Agropyron or Koeleria. Moister positions (drainage draws) on these slopes have a cover of dense shrubs (mainly Amelanchier, Shepherdia, Rosa, Symphoricarpos and Prunus). The steepest slopes are denuded or have sparse Artemisia cover.

Analysis of the steep slope grasslands at Silver Valley identified four major associations: Bearded Wheat Grass (Agropyron trachycaulum), Northern Wheat Grass - Sage (Agropyron dasystachyum - Artemisia), Green Needle Grass - Sage (Stipa viridula - Artemisia) and Porcupine Grass (Stipa curtiseta). Within the two Agropyron types there are several subtypes that may be dominated by other species (e.g. Koeleria, Stipa spartea). In most instances there is an almost imperceptible transition between the different community types. Grasslands cover approximately 3 per cent (55 ha) of the study area.

Only one level grassland community type, Hairy Wild Rye (Elymus innovatus), was identified. This community was found interspersed with shrublands on the tableland finger extensions between creek valleys. It occupies only about 1 ha of the study area.

4.3 Woodlands

4.3.1 White Spruce - Horsetail

This mature community type occurs on the alluvial terrace and island. The inferred soils are restricted to Orthic Regosols and

Cumulic Regosols with clayey-to-sandy texture (subhygric, imperfectly drained).

Picea glauca is the dominant species in the tree canopy (27-30m high). An occasional Populus balsamifera of similar height is present in this layer. There is no second tree canopy present. Tall shrubs are poorly developed being limited to scattered Cornus stolonifera and Alnus tenuiflora. Low shrubs have greater cover but similar low diversity, composed of Rubus idaeus, Cornus stolonifera, Lonicera sp. and Vibernum edule. The herb-dwarf shrub layer is dominated by Equisetum arvense. Other common species include Circaea alpina and Galium triflorum. Dryopteris carthusiana occurs in this community type. Few bryoids are present with epiphytes most common.

This climatic climax community escaped the major regional fire of 1936 that burned the surrounding vegetation. The community is limited to 6 ha in two separate stands. A 27 m high Picea glauca with a dbh of 52 cm was aged at 175 years plus; the largest noted tree had a dbh of 83.7 cm, but no age was determined due to poor coring.

4.3.2 White Birch - Horsetail

Toes of north-facing, slight (10°), subhygric slopes and poor, subhygric alluvial level sites support a Betula papyrifera community type. Soils are restricted to Orthic and Eutric Regosols.

A cover of Betula papyrifera forms the tree canopy layer on the north-facing slopes. On the alluvial site Betula papyrifera dominates the subcanopy (tree layer II), being overtopped by scattered Picea glauca in the tree canopy (layer I). The understory is basically the same on the two sites. Tall shrubs are limited to Alnus tenuiflora and Cornus stolonifera. Alnus tenuiflora is also common in the low shrub layer. Other species that may be present include Rubus idaeus, Ribes oxyacanthoides and Rosa acicularis. The herb-dwarf shrub dominants are Equisetum spp. and Circaea alpina. Other frequent species include Aralia nudicaulis, Rosa acicularis and Gymnocarpium carthusensis. The bryoid layer consists mainly of Hylocomium splendens and Pleurozium schreberi.

The Betula papyrifera is approximately 60-70 years old with a 45-56.8 cm dbh and a height of 16.5-18.3 m. The Picea glauca is decadent (broken tops, rotten centres), over 70 years old, and attains a height of 21.4 m and a dbh of 49.7 cm.

4.3.3 Balsam Poplar - Low-bush Cranberry - Wild Sarsaparilla

On mesic sites that occur on moderately steep (30°) northeast-facing slopes Populus balsamifera is overtopped by Picea glauca and Betula papyrifera (19.5 m high) in the canopy. The tall shrub layer is dominated by Alnus tenuiflora but Alnus crispa and

Betula papyrifera are also present in this layer. The low shrub layer is dominated by Vibernum edule. Ribes oxyacanthoides and Shepherdia canadensis are also present. The herb-dwarf shrub layer is more diverse with Rubus pubescens, Picea glauca, Mitella nuda and Vibernum edule present. The bryoid layer is poorly represented, composed of Cladonia, Pleurozium schreberi and Ptilium crista-castrensis.

An additional subtype in which Populus balsamifera is co-dominant with Betula papyrifera occurs on the lower positions of moderately steep (30°) submesic sites. Understory composition is similar to that found in the more mesic site.

4.3.4 Balsam Poplar - Red-osier Dogwood

This community type occurs on subhygric, imperfectly drained level alluvial sites. Soils are restricted to Orthic and Cumulic Regosols.

Populus balsamifera forms the canopy with a subcanopy (tree layer II) of scattered Picea glauca. Tall shrubs are limited to sparse Alnus tenuiflora. Low shrubs are dominated by Cornus stolonifera with some Rosa acicularis and Rubus idaeus present. The herb-dwarf shrub layer is dominated by Rubus idaeus with Aralia nudicaulis, Galium triflorum, Linnaea borealis, Equisetum arvense and Gymnocarpium dryopteris present in lower cover.

4.3.5 Aspen - Rose - Herb

On moderately steep (30°) north-facing midslopes that are slightly more hygric than the upper slopes, Populus tremuloides composes the subcanopy along with some Betula papyrifera. There are only scattered Populus tremuloides in the canopy which is dominated by Picea glauca. Tall shrubs include Salix planifolia, Alnus crispa, Populus tremuloides and Picea glauca. Low shrubs are dominated by Vibernum edule and Rosa acicularis. Additional species in this layer include Alnus crispa, Salix planifolia and Ribes sp. There is a diverse dwarf shrub-herb layer dominated by Rosa acicularis and Aralia nudicaulis. Fragaria virginiana, Rubus arcticus, Aster conspicuous, Elymus innovatus, Linnaea borealis and Clematis occidentalis are other common species in this layer.

4.3.6 Aspen (Lodgepole Pine) - Buffaloberry - Rose - Hairy Wild Rye

This community type is similar to 4.3.5 and 4.3.7. It occurs on west and northwest subxeric, sandy, well-drained midslope inclined benches (2-20°).

Populus tremuloides is the dominant tree species, occurring mainly in the subcanopy, with lower cover in the low shrub layer. The subcanopy is overtopped by slightly higher (2 m) Pinus contorta and scattered Populus tremuloides. Pinus contorta and Picea glauca occur to a limited extent in the subcanopy. There is no tall shrub layer and the low shrub layer is poorly developed, consisting of Populus tremuloides and Shepherdia canadensis. The dwarf shrub-herb layer is also rather poorly represented, the dominant species being Rosa acicularis and Elymus innovatus. The bryoid layer is relatively rich with several Cladonia spp., Cladina mitis, Polytrichum piliferum, Rhytidium rugosum, Stereocaulon sp. and Thuidium abietinum.

This community type is very limited on the study area. The Pinus contorta was aged at 63 years (12 m high, 30 cm dbh).

4.3.7 Aspen - Buffaloberry - Rose - Hairy Wild Rye - Bluebell

The upper, north-facing slopes and rolling terrain on mesic-to-submesic, moderately well drained Brunisols and Regosols are covered by this community type.

On mesic sites Populus tremuloides forms the canopy. Tall shrubs are few, consisting of Salix sp. and Amelanchier alnifolia. There is a good low shrub layer dominated by Rosa acicularis, Shepherdia canadensis and Vibernum edule. Other shrub species in this layer include Symphoricarpos occidentalis and Populus balsamifera. The dwarf shrub-herb layer consists of Mertensia paniculata, Vicia americana, Aralia nudicaulis, Aster conspicuous and Elymus innovatus.

4.3.8 Aspen - Willow - Buffaloberry - Reed Grass

On the level tableland with subhygric, imperfectly drained soils a Populus tremuloides - Salix planifolia - Shepherdia canadensis - Calamagrostis community type occurs.

Populus tremuloides occurs in both the canopy and subcanopy. Populus balsamifera also is present in the subcanopy as an associate. Tall shrubs are limited to Salix planifolia and Populus balsamifera. Shepherdia canadensis dominates the low shrub layer with Vibernum edule, Cornus stolonifera and Salix sp. common. The dwarf shrub-herb layer is dominated by Calamagrostis canadensis. Additional species include Fragaria virginiana, Cornus canadensis, Bromus ciliatus and Equisetum arvense.

On more mesic tableland sites the cover is similar to that found on the rolling terrain and upper north-facing slopes.

4.3.9 Aspen (Lodgepole Pine) - Willow - Reed Grass

This community type is floristically similar to 4.3.8, but occurs on slightly more mesic, coarser-textured sites, on the level tableland.

Populus tremuloides is the dominant tree species but is overtopped by an open canopy of Pinus contorta (20 m high compared to 11 m for P. tremuloides). There is a well-developed tall shrub layer dominated by Salix planifolia. Shepherdia canadensis and Rosa acicularis comprise a poorly developed low shrub layer. A rich dwarf shrub-herb layer is dominated by Calamagrostis canadensis. Bryoid cover is sparse with Eurhynchium pulchellum, Drepanocladus spp. and Tomenthypnum nitens present.

The Pinus contorta was aged at 27 years (20 m high, 18 cm dbh). This community type is limited to the extreme southeast corner of the study area.

4.4 Shrubland

4.4.1 Buffaloberry - Rose - Hairy Wild Rye

This shrubland occurs on the tableland finger projections between the tributary creek valleys. Soils are loam-textured, submesic, well-drained Chernozems (and possibly Black Solods) on glaciolacustrine parent material.

The low shrub layer is co-dominated by Shepherdia canadensis and Rosa woodsii. Amelanchier alnifolia occurs to a limited extent. The dwarf shrub-herb layer is well developed, dominated by Elymus innovatus. Additional species include Symphoricarpos occidentalis, Galium boreale, Achillea millefolium, Campanula rotundifolia, Geum triflorum, Vicia americana and Monarda fistulosa.

This type grades to a more xeric Elymus grassland (4.6.5).

4.4.2 Saskatoon - Rose

This community type occurs on the drainage draws on moderately steep (20-25°) south-facing slopes. The soils are subxeric, well to rapidly drained Brunisols and Regosols of colluvial origin.

The low shrub layer is sparse with Amelanchier alnifolia, Shepherdia canadensis and Prunus virginiana predominant. The dwarf shrub-herb layer is rich in species and abundance, being dominated by Amelanchier alnifolia and Rosa woodsii and R. acicularis. Other common species include Symphoricarpos occidentalis, Galium boreale, Vicia

americana and Smilacina stellata. Elymus innovatus and Bromus anomalus may be present. The bryoid cover is sparse with Rhytidium rugosum the only species observed.

This type grades to more xeric grasslands outside of the drainage draws.

4.4.3 Saskatoon - Buffaloberry - Dogbane

This community type occurs in the drainage draws on the moderate (15°) southerly exposure slopes and on slumps. The soils are generally subxeric, moderately well drained Regosols.

Amelanchier alnifolia is generally the dominant low shrub with Shepherdia canadensis a co-dominant and Prunus virginiana at a lower cover. Amelanchier alnifolia and Apocynum cannabinum occur in the dwarf shrub-herb layer along with Symphoricarpos occidentalis, Galium boreale, Vicia americana, Achillea millefolium, Monarda fistulosa, Agropyron trachycaulum, Stipa viridula and Carex sp. commonly present.

At the bottom of the slopes this community type grades into a Populus tremuloides type. On the slope the Amelanchier - Shepherdia type rapidly alters to a Stipa or Agropyron grassland.

4.5 Wetlands

4.5.1 Red-osier Dogwood - Rose - Horsetail

This community type occurs on the alluvial terrace on hygric, poorly drained soils. The ground surface is covered by wet silt from overflow of the tributary creeks draining the tableland.

Cornus stolonifera is the predominant shrub in both shrub layers. Scattered Alnus tenuiflora and Salix bebbiana occur in the tall shrub layer. The low shrub layer, in addition to Cornus stolonifera, has a significant cover of Rosa acicularis. Lonicera dioica and Vibernum edule are also present at lower cover values. The dwarf shrub-herb layer is species poor but abundant with Equisetum arvense predominant. Other species include Calamagrostis canadensis, Bromus ciliatus and Agropyron repens.

4.5.2 Sedge - Bulrush

This community type is limited to slump impoundments, usually at the base of steep slopes. Carex aquatilis dominates the dwarf shrub-herb layer. Typha latifolia, Scirpus validus, Hordeum jubatum,

Calamagrostis canadensis, Carex aquatilis, Mentha sp., Hippuris vulgaris, Lemna minor, Eleocharis palustris and Sparganium angustifolium may also be present. There is large species diversity with a total of 39 species identified.

The wetland is surrounded by shrubs, including Alnus sp. and Cornus stolonifera.

The abandoned channel is dominated by Calamagrostis canadensis. Beckmannia syzigachne, Scirpus microcarpus, Equisetum fluviatile, Carex sp., Mentha sp. and Cicuta douglasii are also abundant. This abandoned channel is overlain with soft silt with small open pools of water.

4.5.3 Herb Meadow

A small wet seepage meadow is located at the base of the slump complex along "centre creek" just above the creek. This community type was not sampled due to its limited distribution. A qualitative assessment indicated that the meadow is dominated by Carex atherodes, with Agrohordeum macounii, Hordeum jubatum, Petasites palmatus, Stachys palustris, Cicuta maculata, Rumex occidentalis, Scutellaria galericulata common.

The edge of this meadow is slumping into the creek. There are numerous game trails and trampled mud pits (moose, deer tracks).

4.5.4 Temporary Sloughs

Depressions on the rolling aspen - shrubland slump mosaic contain minor wetlands.

Moister, more permanent water bodies have greater species diversity. Prominent species include Poa palustris, Calamagrostis sp., Alopecurus aequalis, Veronica scutellata, Glyceria grandis, Urtica dioica, Scutellaria galericulata and Ranunculus gmelinii.

Drier, more temporary water bodies are dominated by Poa palustris, Equisetum arvense, Calamagrostis canadensis and Mentha sp. Lemna minor, Stellaria crispa and slime algae are present in the water.

4.5.5 Alluvial Shoreline

A narrow discontinuous strip of alluvial vegetation occurs along the banks of the Peace River. Substrate and vegetative composition varies. There is usually a narrow silt or silt-stone (3-6 in. diameter) matrix up to 1-2 m wide. Equisetum arvense, Allium spp., Hordeum jubatum, Aster sibiricus, Taraxacum officinale, Poa

palustris, Calamagrostis striata, Deschampsia caespitosa and small Salix exigua (increasing in height to approximately 2.5 m towards shore) may be found here. There is usually a 2-3 m high cutbank, the top of which is vegetated by Salix exigua, Alnus tenuiflora, Elymus innovatus and Cornus stolonifera. This shrubland usually quickly grades within a few metres into a Populus balsamifera or Betula papyrifera stand.

Small alluvial stone-silt and sand deltas are found at the mouths of the major tributary creeks. These deltas are mostly unvegetated and the upstream side usually has moderately sized log debris piles.

4.6 Grasslands

4.6.1 Bearded Wheat Grass

This community type occurs on very xeric to xeric, steep south-facing slopes (40-48°). Soils are restricted to rapidly to well drained Orthic Regosols and Orthic Eutric Brunisols (clay loam to sandy loam texture). Step accretion is common and the total unvegetated surface cover varies between 30 and 75 per cent.

Agropyron trachycaulum is dominant. Artemisia frigida cover varies according to slope steepness, with higher values on better-drained, less-steep sites. Other common species include Koeleria macrantha, Vicia americana and Allium cernuum. Opuntia fragilis is a noteworthy species in this community type.

Subxeric, well-drained moderately steep south-facing slopes have an Agropyron trachycaulum community type dominated by dwarf shrubs, principally Symphoricarpos occidentalis. Other shrub species include Rosa spp. and Prunus virginiana. Associated herbs include Vicia americana and Achillea millefolium. This community subtype occurs on coarser-textured soil than the Stipa curtiseta type.

4.6.2 Northern Wheat Grass - Sage

This type occurs on very xeric to xeric, rapidly to well drained, moderate to steep southerly exposures (south and southwest). Soils are restricted to Orthic Regosols and Orthic Eutric Brunisols of clay loam or sandy loam texture.

Dominant species include Agropyron dasystachyum and Artemisia frigida. Koeleria macrantha and Stipa spartea may or may not form a significant portion of the cover. Other common species include Allium cernuum, Astragalus agrestis, Crepis tectorum and Linum lewisii. Noteworthy species are Lomatium foeniculaceum, Orobanche fasciculata

and Opuntia fragilis. A sparse bryoid layer of Plagiomnium cuspidata, Dicranum fragilifolium, Cladonia coniocraea and Tetraphis pellucida is present.

On similar sites, but with a southeast aspect with clay to clay loam Orthic Eutric Brunisols, a Stipa spartea grassland subtype dominated by dwarf shrubs, principally Symphoricarpos occidentalis occurs. Other associated grass species include Koeleria macrantha, Agropyron spp. and Stipa columbiana. Herbs include Allium cernuum, Vicia americana and Commandra pallida.

4.6.3 Green Needle Grass - Sage

This community type occurs on very xeric, well-drained, steep (40°) southeast-facing slopes. Soils are restricted to Orthic Regosols and Orthic Eutric Brunisols of clay loam and sandy loam texture.

Stipa viridula dominates this community type. Artemisia frigida is a subdominant. Other common species include Koeleria macrantha, Stipa curtiseta, Agropyron dasystachyum, Amelanchier alnifolia, Prunus virginiana, Vicia americana, Allium cernuum, Achillea millefolium and Aster laevis.

4.6.4 Porcupine Grass

This community type occurs on xeric, moderate-to-steep, rapidly to well drained south-facing slopes. Soils are limited to clay loam and sandy loam Orthic Regosols and Orthic Eutric Brunisols.

Stipa curtiseta is the dominant species. Species frequently present include Artemisia frigida, Koeleria macrantha, Vicia americana and Agropyron spp. Slightly moister sites on finer material have greater species diversity. Woody species on these sites include Symphoricarpos occidentalis and Rosa woodsii. Anemone cylindrica, Gentianella amarella, Calamagrostis canadensis and Poa sp. are common on these moister, coarser sites.

4.6.5 Hairy Wild Rye

This community type occurs on the level subxeric-to-submesic, moderately well drained Chernozems on the tableland extensions between the tributary creeks.

Elymus innovatus dominates this type although a low shrub layer composed of Rosa acicularis and Shepherdia canadensis is locally abundant. Additional species in the dwarf shrub-herb layer, which is very diverse (24 species) include Galium boreale, Achillea millefolium,

Smilacina stellata, Campanula rotundifolia, Geum triflorum and Anemone multifida.

This community type grades into a shrub-dominated Elymus grassland. The dominant shrub species are Shepherdia canadensis and Rosa acicularis with some Amelanchier alnifolia and Prunus virginiana. This in turn grades into a Populus tremuloides community type on the south ends of these open tablelands. There is a definite change to Populus tremuloides on the ridge line along the northeast edge of this open grassland tableland.

5. WILDLIFE

5.1 Ungulates

Historically, bison, elk and moose roamed the slopes of the Peace River valley between Dunvegan and the B.C.-Alberta border (Envirocon 1976). The only species of the three that remains in large numbers is moose. Elk have been re-introduced to the Clear and Saddle Hills (north and south of Peace River respectively) and may enter the Clear River valley (Envirocon 1976). A few transients may wander along the Peace River valley and into the study area (Myers, Public Lands Division, ENR, Jan, 1985, personal interview).

Mule deer entered the area (Peace River valley upstream from Dunvegan) in 1910 and are fairly abundant now. White-tailed deer moved into the valley in the 1940s but occur now only as transients or possibly in very low numbers (Envirocon 1976).

5.1.1 Moose

The study area is classified as Class II-III (CLI) winter range (Appendix 4.2). A survey in February-March 1975 (Envirocon 1976) estimated the density of moose along the Peace River valley (B.C.-Alberta border to Dunvegan) at 5.8/1 000 ha (fall estimate of 8.5/1 000 ha). A transect that included the Silver Valley study area resulted in an estimate of 2.3 moose/1 000 ha.

An average of nine moose are sighted per ungulate survey by the Alberta Fish and Wildlife Service on the study area (Appendix 7.1).

Analysis of the seasonal distribution of moose indicates that nonagricultural tableland is the most important habitat in the winter (27.3 moose/ha) (Envirocon 1976). There is only about 260 ha of this habitat type within the Silver Valley study area. In the fall moose mainly utilize the south-facing slopes (16.1 moose/1 000 ha) and the alluvial terraces and islands (14.8 moose/1 000 ha) (Envirocon 1976). The valley bottom is also utilized as calving and summer range (Envirocon 1976). There is approximately 80 ha of south-facing slopes and 20 ha of alluvial terrace/island habitat within the Silver Valley study area.

Based on available habitat types and the above density estimates for each type, rough calculations result in a population of 15-17 moose in the Silver Valley study area.

Important browse species include red osier dogwood and willow on islands and alluvial terraces, saskatoon (Amelanchier alnifolia) on south-facing slopes and low bush cranberry (Vibernum edule) on north-facing slopes. North-facing slopes have a high average cover of non-browse species including wild rose (Rosa acicularis) and buffaloberry (Shepherdia canadensis) (Envirocon 1976).

Two moose were sighted during the Silver Valley study. One was observed swimming across the Peace River to the site in July and another one was sighted in September along the ridge west of "centre creek". Numerous tracks were encountered along the Peace River shoreline and several pellet groups were observed along the tributary creek ridges and along cutlines on the tableland. Severe hedging of aspen (Populus tremuloides) and a shed antler were noted at the south end of the level grassland.

Based on regional studies and site specific information the Silver Valley study area is good moose habitat.

5.1.2 Deer

The study area is rated Class III (CLI) winter range (Appendix 4.2). The tableland in the southeast corner is Class III with limitations due to exposure/aspect and climate.

Mule deer are near their northern limit at the study area (Banfield 1974). The average density along south-facing slopes and valley bottoms (B.C.-Alberta border to Dunvegan) is 7.4-9.8 deer/ 1 000 ha. The Envirocon (1976) survey transect that included the Silver Valley site did not note any deer along that stretch of the Peace River valley.

An average of 1.5 mule deer are sighted per ungulate survey by Alberta Fish and Wildlife Service (Appendix 7.1).

The most important habitat for mule deer is the south-facing slopes, especially in early spring (early grass green-up). In summer the slopes and valley bottom (including islands) are the preferred habitats. Saskatoon is the major browse species (Envirocon 1976).

During the Silver Valley study numerous tracks were observed, mainly along the Peace River shoreline and the tributary creeks. Bedding sites were fairly common in the aspen clumps in the rolling slump terrain. An antler rub was observed on a pine on a creek ridge. Deer sightings included one buck along a cutline in the southeast corner of the study area, two bucks on the grassland-aspen slopes of "centre creek" and a doe and fawn on an island two kilometres downstream from the study area on the Peace River.

The Silver Valley site provides good mule deer habitat. Population estimates are probably less than those for moose (i.e. less than 10 deer).

5.2 Large Carnivores

Wolf and black bear are the most common large carnivores along the Peace River valley from the B.C.-Alberta border to Dunvegan (Envirocon 1976). Although within the range of grizzly bear and cougar (Banfield 1974) there are no confirmed reports of these two species in the area (Envirocon 1976, Rintoul 1985).

Black bear density is estimated at 4.4 bears/1 000 ha. Seasonal range includes grass slopes in spring, alluvial shoreline where they feed on beaver in summer, and shrubland in late summer-fall to feed on berries (Envirocon 1976).

Black bear sign was fairly prevalent in the Silver Valley area. Numerous tracks were observed along the tributary creeks and the Peace River shoreline. Scats and anthill diggings were common along the tributary creek ridgelines. A yearling was sighted in June along "W island creek" ridge.

The mosaic of grassland and shrubland at the Silver Valley site provides good black bear habitat. However due to the study area's small size in relation to the home range of black bears (20 720 ha) it only forms a small fraction of the habitat required by an individual bear.

Similarly the study area provides only a small portion of the range for wolves (39 000-140 000 ha home range). The Envirocon (1976) study observed two wolf packs of three wolves each along the Peace River (one at Clear River and one at Montagneuse River). One wolf scat was found on the study area along the Peace River during the Silver Valley study.

5.3 Furbearers

The study area, situated on the fringe of the boreal forest and lacking significant aquatic habitat, is not particularly good furbearer habitat. This is reflected in data from trap returns (beaver and coyote are the only species taken) for the study area vicinity.

Beaver activity on the study area is limited to two old beaver ponds (situated in slump impoundments) and an active lodge (on the river side of the relict island). Envirocon (1976) reported an active

cache on the Peace River bank just west of the island. Caches per linear kilometre of river (south bank of Peace River) were estimated at 0.08 in the 1975 survey (Envirocon 1976) which signifies a low population. There is only 8.9 km of Peace River shoreline within the study area. Better quality habitat is situated along the major tributary rivers and creeks of the Peace River outside of the study area.

Other furbearer sightings/sign during this study were limited to coyote (tracks), red squirrel (heard, middens) and snowshoe hare (pellets). A list of mammals observed in the study area appears in Appendix 6.2.

5.4 Waterfowl

There is virtually no waterfowl nesting and feeding habitat in the study area (CLI Class VI with limitations due to adverse topography and fast-flowing water). Small areas of suitable habitat occur in the abandoned channel and the slump impoundment at the west end (Envirocon 1976). Better habitat occurs farther downstream (Appendix 4.2).

The Peace River itself is a spring and fall staging area for ducks (mainly dabblers) and geese (Canada, white-fronted, snow). The closest staging area to the Silver Valley site is approximately two kilometres downstream. Larger concentrations of waterfowl are found upriver (west of Clear River mouth) and downriver (Montegneuse River) from the study area.

5.5 Other Birds

The study area provides habitat for a variety of passerine birds as a result of the mosaic of grassland, shrubland and forest communities. Balsam poplar forests have the greatest density and number of species, closely followed by aspen. Other habitats with high bird densities include white spruce forests and shrublands. Grass slopes have low densities of passerine birds and few species (Envirocon 1976).

An annotated list of bird species appears in Appendix 7.3.

5.6 Fish and Aquatic Invertebrates

No on-site inventory occurred during the present study. An in-depth study completed as part of the Dunvegan hydro site impact assessment (Envirocon 1976) is used to infer species presence and abundance in this stretch of the Peace River (Envirocon study encompassed area from B.C.-Alberta border to Dunvegan).

A total of 15 species (Appendix 6.5) are present in the Peace River upriver from Dunvegan. The most abundant fish are non-game species: longnose sucker (Catastomus catastomus), lake chub (Couesius plumbeus), longnose dace (Rhinicthys cataractae) and flathead chub (Platygobio gracilis). Only two game species, walleye (Stizostedion vitreum) and northern pike (Esox luscius), occur in any numbers. All game species present are thought to be nonbreeders as there is no suitable spawning habitat. Nongame species probably spawn here.

Because of high sediment loads (Secchi dish less than 5 cm in June) that result in poor light penetration, there is low phytoplankton (primary) productivity (chlorophyll 'a' conc. 0.001-0.095 mg/l) in this reach of the Peace River.

This high sediment load, in combination with fluctuating water levels and shifting bed loading is characterized by a low benthic organism population. Of invertebrates that are present the true flies (Diptera) are the most abundant benthic macro organisms. In the surface drift, Copepods, true flies and Coelenterata are most abundant. Dragonflies (Odonata), stoneflies (Plecoptera) and mayflies (Ephemeroptera) occur in small numbers.

6. SPECIAL FEATURES

For the purposes of this report, special features are defined as rare or unique physical resources or biological species/communities or as excellent examples of representative features of a natural region.

The Silver Valley study area has the following special features:

1) Excellent representative steep slope and level grasslands (Stipa, Agropyron and Elymus) and shrublands (Amelanchier, Shepherdia and Rosa). Their ungrazed character is particularly noteworthy as few such sites remain in the Peace River Parkland.

2) Excellent representative examples of slump features and associated rolling slump mosaic.

3) Excellent representative examples of alluvial floodplain terrace and island with mature white spruce (over 175 yrs.), balsam poplar and white birch woodlands. These are the result of site being fire refugium.

4) Diversity of vegetation communities and site positions.

5) Rare plant in Alberta, Stellaria crispa (Packer and Bradley 1984).

6) Extension to recorded collection range (Packer and Bradley 1984) for six species: Cinna latifolia, Carex retrorsa, Corallorhiza striata, Asclepias ovalifolia, Orobanche fasciculata and Aster alpinus.

7) Four species -- Lomatium foeniculaceum, Artemisia longifolia, Aster sibiricus and Solidago gigantea -- with few reported collections in the region (Packer and Bradley 1984).

In addition to the above, there are numerous other special features including bedrock exposures, bedrock "shelves" and "holes", permanent and ephemeral creeks, an abandoned channel, creek deltas, slump impoundments and rich wet herb meadows (Map 8).

7. EVALUATION

Wilkinson (1981) completed the most intensive analysis of Peace River Parkland native grassland sites, surveying 18 sites, four of which are valley slope grasslands. Floristically the Silver Valley site compares favourably with Wilkinson's valley slope sites; 65-75 per cent of all species recorded by Wilkinson have been observed at the Silver Valley study area. The major difference is the predominance of Carex spp. on Wilkinson's sites. This may be due to the generally higher level of disturbance on those sites. The Heart River (NE29-83-21-W5) site is the least disturbed of the four. The Misery Mountain site (NW30-83-21-W5) has OHV trails and is being encroached by subdivisions; the Airport site (SE17-83-22-W5) was burned over in 1977; and the Dunvegan site (SE20-80-5-W5) has been heavily grazed for the past 10 years. Additionally Wilkinson (1981) states that the sites are floristically fairly to very homogeneous. In contrast the Silver Valley site is quite diverse, possessing different slope positions and aspects.

An overview of potential sites for ecological reserves in Alberta rated the Silver Valley site as having the highest ecological value (score of 55.35) of six sites analysed for the Peace River Parkland section (Cottonwood 1983). The high value resulted mainly for landscape representation, vegetation diversity and lack of disturbance (Appendix 2.3).

A review of potential preservation sites in the Peace River Parklands biogeographic zone by Lee (1981) identified the Silver Valley site, along with Highland Park and Fairview-Erinlodge as possible supplementary ecological reserves. Adams (1981a) noted the importance of this site as a potential natural area for range research studies.

The present biophysical analysis supports the above statements. Field work and analysis of the Dunvegan site is in preparation (Rintoul 1985b) and a cursory field inspection of the Highland Park site was completed in 1984 by the author. The Silver Valley study area is more diverse in vegetation communities and microhabitats than Highland Park and is significantly less disturbed than the Dunvegan site. Also, the configuration of the Silver Valley site facilitates protection of the grasslands, because they are isolated from easy access either from inland or, in the case of the grasslands along the tributary creeks, from the Peace River valley.

Review of available information from protected sites in B.C., where Peace River grasslands are classified as part of the Boreal White

and Black Spruce Biogeographic Zone (BWBS), suggests that the Silver Valley site possesses similar vegetation communities.

Finally the Silver Valley site possesses all the major vegetation divisions identified as occurring along the Peace River from the B.C.-Alberta border to Dunvegan (Envirocon 1976). Thus the study site is representative of the Peace River Valley.

In conclusion the Silver Valley site is the best Peace River Parkland valley site identified to date, due to its representativeness, diversity and lack of disturbance.

8. RECOMMENDATIONS

To protect the integrity of the features of the Silver Valley site it is recommended that:

1) The site be considered for formal conservation status.

2) Due to the sensitivity of the grasslands no surface access (roads, trails, cutlines) should be permitted into the interior of the area.

3) Grazing should not be allowed as the significance of the site is due to its ungrazed condition.

4) Consideration be given to regulating fires (designated spots or ban entirely) along the Peace River adjacent to the site to prevent accidental destruction of the mature alluvial forests.

APPENDIX 1

METHODS

Physical Resources

Most physical resource data were obtained by reviewing the available literature, including maps, air photos and reports. A limited reconnaissance soil survey was completed in September 1984 by Wayne Tedder of Public Lands Division, ENR. Throughout all portions of the field work for the present report, field notes on physical site characteristics of the study area were made.

Biological Resources

Pertinent air photos, maps and reports were reviewed in determining initial vegetation sampling plots. These initial locations were sometimes altered on the ground in order that a fairly homogeneous community could be sampled. Standard Natural Areas vegetation plot sheets (see next page) were completed for each community sampled. Plot size varied according to homogeneity). The community name was ascertained from the dominant species present. In addition to the sampled communities, numerous other ones were qualitatively described. A list of all species encountered during the study was also completed.

A bird survey was completed in mid-June 1984. All sightings and song (where identifiable), as well as habitat, were recorded. Notes were also kept on all wildlife sightings/sign throughout the field study.

STAND DESCRIPTION

Veg. Plot No. 1.

Project I.D. 8.

Legal 14.

Location:

Biog. Z. 21.

IBP Code 23.

Veg. Type 28.

Landform 32.

Elevation 36.

Slope 40.

Aspect 42.

Soil 44.

Sociation Name

Site Position Diagram (refer to data form no. _____)

Photo roll no. _____

Photo no. _____

Scale

Direction

General Description and Remarks:

47. Moisture Regime
1. very xeric
2. xeric
3. subxeric
4. submesic
5. mesic
6. subhygric
7. hygric
8. sublydric
9. hydric

48. Drainage
rapidly
well
mod. well
imperfectly
poorly
very poorly

49. Site Position
crest
upper slope
middle slope
lower slope
toe
depression
level

50. Stability Index
unstable
rapid change
mod. change
slow change
stable
climax

51. Microtop
smooth
micro mound
slightly mound
mod. mound
strongly mound
severely mound
extr. mound
ultra mound

Rock 52.

Humus 54.

Min. Soil 56.

Deadfall 58.

Water 60.

T. Unveg. 62.

% Cover	Species	Cover	Av. Hgt.	DBH	Rings
Tree C. I 64.					
Tree C.II 66.					
Shrub C. I 68.					
Shrub C. II 70.					
72.	Mesh Dwarf Shrub		74.		

Plot No. 1. _____ Date: _____ Other Obs: _____

LYR	CODE	%	SPECIES	LYR	CODE	%	SPECIES
8.	10.	14.					

APPENDIX 2.2

ECOLOGICAL RESERVES EVALUATION SHEET - PEACE RIVER PARKLAND

Area Name: Silver Valley Ref. #: _____ Size: 18.13 sq.km.

LANDSCAPE REPRESENTATION (weight=2.14), absent=0, rare=1, limited=2, extensive=4:

Upland:
1. glaciolacustrine ___

Valley:
2. river terrace 1 3. small stream(valley) 1 4. eroded bedrock 1
5. vegetated slope 4

Wetland:
6. wet meadow ___ 7. shallow marsh ___ 8. deep marsh/open water ___
9. lake ___ 10. seepage/springs 1

Other: (score 1 for each if present)
11. +/- clear stream 1 12. turbid stream 1 13. permanent stream 1
14. intermittent stream 1

Total= 12 X 2.14 =[25.7]

VEGETATION DIVERSITY (sum of number of types, two values) (weight=1.0):
no. community types (overstory dominance-max. 3 spp. in mixed) 12
no. physiognomic types (over & understory-tree,tallshrub,lowshrub,forb,grass,cryptogam) 6
Total= (12 + 6)X 1.0 =[18]

SIZE (sum of two values) (weight=2.0):
area size (sq. km.):
more than 100 (10)___ 10-100 (actual size/10) 1.8 less than 10 (0) ___
buffer plus area size (sq. km.):
more than 500 (4)___ 30-500 (actual size/100.25)___ less than 30 (0) 0
Total= (1.8 + 0)X 2.0 =[3.6]

SPECIAL FEATURES (weight=2.0), each type receives 1 (one) point:
rare wildlife habitats ___ rare vegetation types 1 outstanding specimens ___
endangered species (Alta.)___ rare species (Alta.) ___ peripheral species ___
disjunct/relict species 1
Total= 2 X 2.0 =[4]

DEGREE OF DISTURBANCE (weight=1.0):
none visible (4) 4 minor with minor effects (2) ___ major adjacent (0) ___
Total= 4 X 1.0 =[4]

TOTAL ECOLOGICAL VALUE (total of 5 factors above): [55.35]

OTHER FEATURES (weight=1.0), 1 (one) point for each type:
outstanding cultural ___ outstanding geological ___ extensive research ___
Total Value= 0 X 1.0 =[0]

MANAGEMENT PROBLEMS (weight=1.0), sum of two values:
distance to nearest Parks, Forestry, Lands Field Staff (km.):
less than 50 (1.0) ___ more than 50 (0) 0
distance to nearest population (km.):
remote, no road access (2) 2 not remote/near town 1k+(1)___ adj. town 1k+ (0)___
Total=(0 + 2)X 1.0=[2]

LAND USE CONFLICTS (weight=1.0)
major land use conflict (0) ___ minor or no land use conflict (1) 1
Total= 1 X 1.0=[1]

TOTAL NON-ECOLOGICAL VALUE (sum of 3 factors above)=[3]

NOTES: Elymus innovatus - Amelanchier alnifolia.
Good variety of slope vegetation.

APPENDIX 2.1

Alberta

ENERGY AND
NATURAL RESOURCES

FROM B. Adams
Grazing Land Management

OUR FILE REFERENCE

YOUR FILE REFERENCE

TO P. Lee
Natural Areas

DATE 25 September 1980

TELEPHONE 7-3598

SUBJECT POSSIBLE NATURAL AREA SITE ON THE
PEACE SLOPES
SECS. S½ 27, N½ 22, NW 23, TWP. 83, RGE. 10,
W6TH MERIDIAN

The river slope site in question is of particular interest to our unit and should be included in a natural area reservation, for the following reasons:

a) Excellent condition grass and shrub communities which presently remain ungrazed by cattle, provide an excellent area for future range evaluation and study.
b) Such an ungrazed site is useful for monitoring seasonal utilization of shrub communities by wildlife species especially mule deer.
c) Step accretian and micro-slumping are natural processes on ungrazed sites, both of which can be observed in the area outlined.

Because of the slope and aspect sequences present, this site was sampled by the range unit during the 1980 field season. Any effort made to further assess this site as a potential natural area site would be enthusiastically supported by our section.

Barry Adams

BARRY ADAMS
Grazing Land Management

BA/mw

APPENDIX 3.1

LIST OF AIR PHOTOS FOR THE STUDY AREA

(Available from Alberta Energy and Natural Resources,
2nd Floor, Petroleum Plaza North, Edmonton)

Date	Job No.	Scale	Roll	Exposure
1984	84-6	1:60 000		
1980	80-122	1:60 000	AS2186	176-178
1979	79-32; 79-33	1:15 000	AS2006	3-8
			AS2005	140-146
1978/79	78-52; 79-101		AS1813	88-92
				66-68
1974	74-50B	1:50 000	AS1348	93-94
1971	71-89	1:31 680	AS1149	256-306
				304-306
1966		1:31 680	AS929/67	95-99
			AS929	171-173
1951		1:15 840	AS261	176-181
			AS263	139-145
1949		1:40 000	AS95	229-232

APPENDIX 3.2

LIST OF RESOURCE MAPS FOR THE STUDY AREA

Type	Scale	Map No.
Topographic (N.T.S.)	1:250 000	84D
	1:50 000	84D/3, 84D/4
Provincial Access	1:250 000	84D
Provincial Record Series	1:50 000	84D/3, 84D/4
Forest Cover (Phase I)	1:63 360	84D/3, 84D/4
Canada Land Inventory (Capability Maps for Outdoor Recreation, Waterfowl, Ungulates, Forestry, Agriculture)	1:250 000	84D
Bedrock Geology	1" = 2 mi.	44-31 GSC
Structure of the Base of Fish Scale Horizon	1" = 4 mi.	Area 11 ERCB
Paleozoic Surface	1" = 4 mi.	Area 11 ERCB
Geology and Groundwater	1" = 8 mi.	acc Bull 16 ARC
Surficial Geology	1" = 8 mi.	acc Bull 16 ARC
Soil Survey	1" = 3 mi.	acc ASSR17 ARC
Hydrogeology	1:500 000	acc ESR82-4 ARC
Oil and Gas Areas	3/4" = 1 mi.	Pouce Coupe ENR
Ecological Land Classification	1:250 000	Blueberry Mtn. ENR

NOTE:
GSC - Geological Survey of Canada
ERCB - Energy Resources Conservation Board
ARC - Alberta Research Council
ASSR - Alberta Soil Survey Report
ESR - Earth Sciences Report
ENR - Energy and Natural Resources (Alberta)
acc - accompanies

APPENDIX 4.1

ARCHAEOLOGICAL SITES ALONG THE PEACE RIVER VALLEY IN THE VICINITY OF THE STUDY AREA

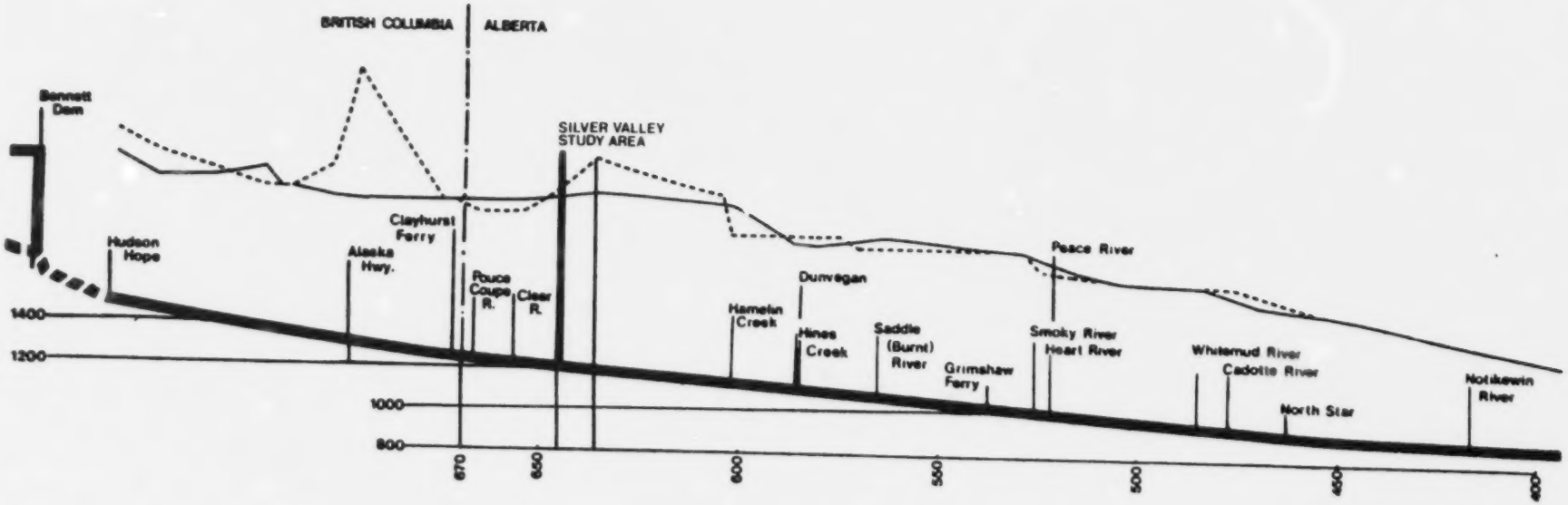
Site No.	Location	Elev.	Height Above River(m)	Size	Significance
HbQv1	Terrace at stream mouth	395	30	40x10m	scattered flakes
HbQv2	Terrace at stream mouth	395	30	---	scattered flakes
HbQu1	Terrace at stream mouth	380	15		concentrated cores, flake scrapes
HbQu2	Terrace edge	455	150	50x10m	scattered flakes
HbQu3	Terrace edge	455	150	20x10m	scattered flakes
HbQu4	Terrace at stream mouth	455	150	50x10m	scattered flakes
HbQu5	Terrace at stream mouth	455	150	---	scattered flakes
HbQu6	Floodplain	365	3	---	flakes probably eroded from higher level
HbQu7	Terrace at stream mouth	455	150	800x10m	small clusters of flakes

SOURCE: Smith (1976)

NOTE: Elevation is metres above sea level (asl). HbQv and HbQu grids cover a larger area than the Silver Valley study area.

APPENDIX 5.1

LONGITUDINAL SECTION OF PEACE RIVER VALLEY:BENNETT DAM,B.C. - NOTIKEWIN RIVER,ALBERTA



Legend

——— Valley Top-Right Side
------- Valley Top-Left Side

NOTE: Horizontal Scale in kilometres (from head of Slave River)
Vertical Scale in metres (above mean sea level)

SOURCE: Adapted from Kellerhalls,Neill and Bray (1972).

APPENDIX 5.2

AQUIFER CHARACTERISTICS

Rock Unit	Description	Permeability
Alluvial-terrace deposits	sand and gravel deposits 5-12 m thick	Medium
Lacustrine deposits	sand, silt and clay 0.3-10 m thick	Low
Till deposits	clay, silt, sand and boulders up to 200 m thick	Very low
Buried-channel deposits	sand, sand and gravel 6-17 m thick	Medium-high
Dunvegan Formation	sandstone, siltstone, some beds up to 27 m thick	Low

SOURCE: Adapted from Jones (1966)

APPENDIX 5.3

Peace River Slopes Soil Reconnaissance

Site	Description
P-1	Ah 0-6cm; clay loom; stonefree; moderately, fine, granular; friable. Bm 6-18cm; clay; stonefree; moderately, medium, granular; friable. Ck, 18-32cm; clay; stonefree; pseudoplaty; friable Ck_2 32+cm; clay; stonefree; pseudoplaty; friable Slope: 72% SSE Soil: Orthic Brunisol (likely Eutric) on glaciolacustrine Location: grassed slope Comments: slow surface movement
P-2	Ah 0-6cm; loam Ahe 6-11cm; loam AB 11-24cm; clay Bnt 24+cm; clay; 1% gravel Soil: Chernozem on glaciolacustrine (possible Black Solod) Location: original tableland along grass margin
P-3	Ah 0-3cm; clay loam; strong, fine granular C 3-13cm, clay Ck 13-42cm; clay Csak 42+cm; clay Slope: 52% Soil: Orthic Regosol Location: sloping grassland below P-2
P-4	The entire stretch of SW-facing grassland is medium textured. Surface textures are loam and the parent material is clay loam. The slopes are mainly buff-coloured till containing many gravel-sized stones. This till appears to be derived from the underlying Dunvegan Sandstone rather than the local shale as is usually the case. In one location, lacustrine deposits were situated over the till and resembled the till lithology, minus the stones. The grassed slopes in the area have approximately a 75% slope. Numerous terracettes were present on these steep slopes. The 70% slope appears to be critical for the formation of terracettes in this material. The paths of animals accentuates the development of the terracettes.

Site	Description
P-4	Several soil profiles were examined in the grassed slopes. Orthic Brunisols have developed on the more gentle slopes (Ah, Bm, C) and Orthic Regosols (Ah, C) on the 70+% slopes. Dunvegan sandstone was outcropping in the mid to upper slope position overlooking the creek where slope failure was occurring.
P-5	Ah 0-7cm; loam; weak fine granular; 10 YR 2/1 (d); stonefree C 7-26cm; clay; strong fine subangular blocky; 10 YR 3/1(d); stonefree Ck, 26-52cm; clay; strong fine subangular blocky; 10 YR 3/1(d); stonefree Ck_2 52+cm; clay loam-clay; massive; 10 YR 3/1-4/4; stonefree Soil: Orthic Regosol on glaciolacustrine Slope: 42% Location: grassed slope Comments: dessication cracks in C horizons
P-6	L-H 1-0cm Ahj 0-1cm; clay loam; medium fine granular; stonefree C 1-20cm clay loam-clay; stonefree Ck 20+cm; stonefree Soil: Orthic Regosol or colluvium Slope: 37% Location: draw composed of debris from slump Comments: very similar to P-5 although lacking dessication cracks (as site is moist) and having a discontinuous Ah.
P-7	L-H 4-0cm Bm 0-10cm; clay loam; 10 YR 3/1.5(m); stonefree C 10+cm; clay; 10 YR 3/1(m); stonefree Soil: Orthic Brunisol on glaciolacustrine Location: wooded slope Comments: shear features in unstable C horizon; numerous unstable slopes in vicinity

Sept. 1984

APPENDIX 5.4

LAND APPRAISAL REPORTS

REPORT NOTED

No Files

APPRAISAL REPORT

File No.

1. Land All Sec. 17 Tp. 81 Rge. 10 W. 6 Mer. Purpose of Appraisal soils
Name _____ Address _____ Rail Head _____ Miles
Rural Residence - Land _____ Sec. _____ Tp. _____ Rge. _____ W. _____ Mer. _____
Access to land access possible to SE corner of section

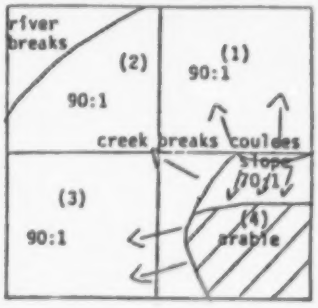
2. Topography gently undulating

Cover medium density of small and medium poplar

Merchantable Timber none ?
Refer to Forestry no ? Commercial Sand and Gravel none Water Supply none
Carrying Capacity (Reason if not Zonal) 85:1 coulees
Land capability recreation rating 6 Commercial or Industrial Value none ?
Soil:

L-H - 1"
Ah - 0 - 4" 1
Ahe - 2" Cl
Ae - 6" Cl
Bt - C solodic

		1	2	3	4
Acres					70
Rating: a - Great Gp.	grey wooded	no rating			60
b - Profile	solodic	coulees			80
c - Texture	Cl				80
d - Stones	few				95
e - Topography	gently undulating				90
Basic Index					33
TOTAL ARABLE ACRES 70 Agr. Capability Rating		7	7	7	4



		Acres	Cost to Clear Per Acre	Cost to Break Per Acre	Basic Index	Value Per Acre 100 C.P.	Value Per Acre 275 C.P.	Value for Area
Arable	(a) (b) (c)	70	$ 40.00	$ 18.00	33	$ 6.94	$ 19.09	$1336.30
Non-Arable		570	Reasons	coulees	85:1	$ 3.50	$ 9.63	$5489.10
Cultivation	(a) (b)		(Exclusive of raw land value)					
Total Acreage		640	In Crop _____ Acres _____			Total Value		$6825.40
						Average Value Per Acre		$ 10.66

4. Improvements: (List all building improvements including well, pump, fence and summerfallow)

	Size	Material	Ownership	Value
nil				$
				$
				$
				$
				$
Summerfallow _____ Acres @ $ _____ per acre				$

5. Remarks and Recommendations: Because of rough terrain, low grazing potential, and greater suitability for wildlife habitation, I recommend placing an RLC 5 reservation on NE, NW and SW quarters.

Part of the SE quarter would be suitable for grazing but the arable portion of the land should be fenced off from the creek breaks so no grazing can occur on the creek breaks at all. I recommend placing an RLC 2 reservation on the quarter with the above mentioned restrictions including no range improvements.

Date of Inspection October 7, 1975

Inspector Dan Grahn
Dan Grahn

REPORT NOTED

APPRAISAL REPORT

File No.

Land All Sec. 21 Tp. 83 Rge. 10 W. 6 Mer. Purpose of Appraisal soils

Name _____ Address _____ Rail Head _____ Miles

Rural Residence - Land _____ Sec. _____ Tp. _____ Rge. _____ W. _____ Mer. _____

Access to land none

Topography river breaks

Cover poplar, willow

Merchantable Timber none ?

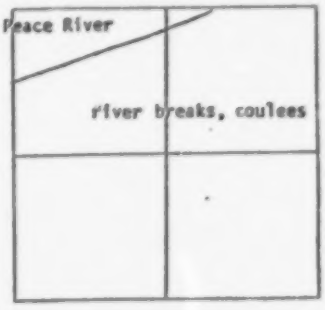
Refer to Forestry no ? Commercial Sand and Gravel _____ Water Supply river

Carrying Capacity (Reason if not Zonal) 160:1 river breaks, coulees

Land capability recreation rating 6 Commercial or Industrial Value none ?

Soil: _____

	1	2	3	4
Acres				
Rating: a - Great Gp.				
b - Profile	NO RATING: river breaks, coulees			
c - Texture				
d - Stones				
e - Topography				
Basic Index	160:1			
TOTAL ARABLE ACRES 0 — Agr. Capability Rating	7			



		Acres	Cost to Clear Per Acre	Cost to Break Per Acre	Basic Index	Value Per Acre 100 C.P.	Value Per Acre 275 C.P.	Value for Area
Arable	(a)	0	$	$		$	$	$
	(b)		$	$		$	$	$
	(c)		$	$		$	$	$
Non-Arable		640	Reasons	river breaks, coulees	160:1	$ 1.95	$ 5.36	$ 3430.40
Cultivation	(a)		(Exclusive of raw land value)			$	$	$
	(b)					$	$	$
Total Acreage		640	In Crop _____ Acres _____			Total Value		$ 3430.40
						Average Value Per Acre		$ 5.36

4. Improvements: (List all building improvements including well, pump, fence and summerfallow)

	Size	Material	Ownership	Value
nil				$
				$
				$
				$
				$
				$

Summerfallow _____ Acres @ $ _____ per acre

5. Remarks and Recommendations: I recommend placing an RLC 5 on the entire section for protection of watershed and wildlife habitat.

Date of Inspection October 7, 1975

Inspector Dan Grahn

Dan Grahn

REJECTED

Form LA 34
(revised) 1968

In file

APPRAISAL REPORT

File No.

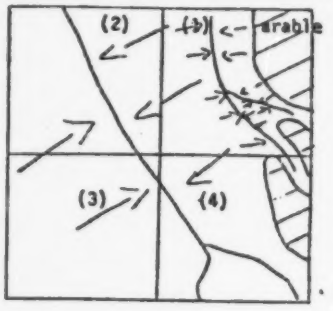
1 Land A11 Sec. 23 Tp. 83 Rge. 10 W. 6 Mer. Purpose of Appraisal soils
Name _____ Address _____ Rail Head _____ Miles
Rural Residence - Land _____ Sec. _____ Tp. _____ Rge. _____ W. _____ Mer. _____
Access to land none

2 Topography undulating

Cover dense cover of medium poplar

Merchantable Timber none ?
Refer to Forestry no ? Commercial Sand and Gravel none Water Supply creeks
Carrying Capacity (Reason if not Zonal) 100:1 coulees, river breaks
Land capability recreation rating 6 Commercial or Industrial Value none ?
Soil:
I-H - 1°
Abe - 2° i
Ae - 2° fl
Bt - C normal

		1	2	3	4
	Acres	30			10
Rating: a - Great Gp.	grey wooded	60	No		60
b - Profile	normal	90	rating		90
c - Texture	fl	80	river		80
d - Stones	few	95	breaks		95
e - Topography	undulating	85	coulees		85
	Basic Index	35	100:1	100:1	35
TOTAL ARABLE ACRES 40	Agr. Capability Rating	4	7	7	4



		Acres	Cost to Clear Per Acre	Cost to Break Per Acre	Basic Index	Value Per Acre 100 C.F.	Value Per Acre 275 C.F.	Value for Area
Arable	(a)	40	$	$	35	$	$	$
	(b)		$ 40.00	$ 18.00		$ 7.53	$ 20.71	$ 828.40
	(c)		$	$		$	$	$
Non-Arable		600	Reasons	river breaks, coulees	100:1	$ 2.30	$ 6.33	$ 3798.00
Cultivation	(a)		(Exclusive of raw land value)			$	$	$
	(b)					$	$	$
Total Acreage		640	In Crop _____ Acres _____			Total Value		$ 4626.40
						Average Value Per Acre		$ 7.23

4 Improvements: (List all building improvements including well, pump, fence and summerfallow)

	Size	Material	Ownership	Value
nil				$
				$
				$
				$
				$
Summerfallow _____ Acres @ $ _____ per acre				$

5 Remarks and Recommendations: I recommend placing an RIC 5 on the entire section for protection of watershed and wildlife habitat.

Date of Inspection October 7, 1975

Inspector Dan Grahn
Dan Grahn

REPORT NOTED

Form LA 34
(revised) 1968

APPRAISAL REPORT

File No.

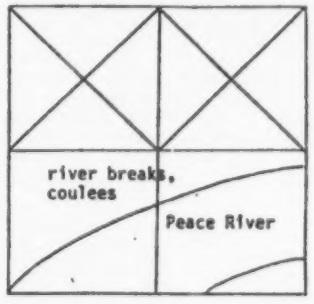
1. Land S½ Sec. 35 Tp. 83 Rge. 10 W. 6 Mer. Purpose of Appraisal soils
Name _____ Address _____ Rail Head _____ Miles
Rural Residence - Land _____ Sec. _____ Tp. _____ Rge. _____ W. _____ Mer. _____
Access to land _____

2. Topography river breaks, coulees

Cover poplar, willow

Merchantable Timber none ?
Refer to Forestry no ? Commercial Sand and Gravel none Water Supply river
Carrying Capacity (Reason if not Zonal) 100:1 river breaks, river, coulees
Land capability recreation rating 6 Commercial or Industrial Value none ?
Soil: _____

		1	2	3	4
	Acres				
Rating a - Great Gp.					
b - Profile					
c - Texture	NO RATING: river breaks, coulees				
d - Stones					
e - Topography					
	Basic Index	100:1			
TOTAL ARABLE ACRES 0	Agr. Capability Rating	7			



		Acres	Cost to Clear Per Acre	Cost to Break Per Acre	Basic Index	Value Per Acre 100 C.F.	Value Per Acre 275 C.F.	Value for Area
Arable	(a)	0	$	$		$	$	$
	(b)		$	$		$	$	$
	(c)		$	$		$	$	$
Non-Arable		320	Reasons	river breaks coulees	100:1	$ 2.30	$ 6.33	$ 2025.60
Cultivation	(a)		(Exclusive of raw land value)			$	$	$
	(b)					$	$	$
Total Acreage		320	In Crop _____ Acres _____			Total Value		$ 2025.60
						Average Value Per Acre		$ 6.33

4. Improvements: (List all building improvements including well, pump, fence and summerfallow)

	Size	Material	Ownership	Value
nil				$
				$
				$
				$
				$
Summerfallow _____ Acres @ $ _____ per acre				$

5. Remarks and Recommendations: I would recommend placing an RLC 5 reservation on the land for watershed protection and conservation of wildlife habitats.

Date of Inspection October 7, 1975

Inspector Dan Grahn

Dan Grahn

APPENDIX 6.2

ANNOTATED LIST OF VASCULAR PLANTS OBSERVED
ON THE SILVER VALLEY STUDY AREA

EQUISETACEAE (Horsetail Family)

Equisetum arvense L. - locally common; alluvial spruce and mixedwoods and moist aspen woodlands

Equisetum fluviatile L. - locally common; sedge - bulrush abandoned channel

Equisetum hyemale L. - occasional; alluvial shrubland

Equisetum palustre L. - occasional; alluvial birch woodland

Equisetum pratense Erh. - locally common; alluvial birch - poplar alluvial woodlands

POLYPODIACEAE (Fern Family)

Dryopteris carthusiana (Vill.) H.P. Fuchs - occasional; mature spruce, poplar alluvial woodland

Gymnocarpium dryopteris (L.) Newm. - occasional; mature alluvial spruce and birch woodlands

CUPRESSACEAE

Juniperus communis L. - rare; restricted to small area on valley ridge line with lodgepole pine

PINACEAE (Pine Family)

Picea glauca (Moench) Voss - common; alluvial woodlands, creek valley bottoms

Pinus contorta Loudon - locally common; in southeast corner of area on tableland

TYPHACEAE (Cattail Family)

Typha latifolia L. - locally common; abandoned beaver ponds/slump impoundments

SPARGANIACEAE (Bur-reed Family)

Sparganium angustifolium Michx. - occasional; abandoned beaver pond in rolling aspen woodland on upper rolling slopes

POTAMOGETONACEAE (Pondweed Family)

Potamogeton pusillus L. - occasional; sedge - bulrush slump impoundment slough

GRAMINEAE (Grass Family)

M Agrohordeum macounii (Vasey) Lepage - occasional; moist herb meadow

Agropyron dasystachyum (Hook.) Scribn. - locally common; steep south-facing grassland

I Agropyron repens (L.) Beauv. - occasional; along Peace River shoreline, alluvial shrubland

L Agropyron smithii Rydb. - rare?; steep eroded west-facing grasslands

Agropyron trachycaulum (Link) Malte - locally common; slope grasslands

Agrostis scabra L. - occasional; along cutlines in aspen woodland

Alopecurus aequalis Sobol. - occasional; slump impoundment sloughs in rolling aspen woodland

Beckmannia syzigachne (Steud.) Fern. - common; slump impoundments, abandoned channel

Bromus anomalous Rupr. ex Fourn. - occasional; shrubland in rolling aspen slump mosaic

Bromus ciliatus L. - occasional; alluvial shrubland

Calamagrostis canadensis (Michx.) Beauv. - common; slump impoundments, abandoned channel

Calamagrostis inexpansa A. Gray - occasional; slump impoundments

Calamagrostis stricta (Timm) Koeler - occasional; river shoreline

E Cinna latifolia (Trev.) Griseb. - occasional; alluvial mature spruce woodland

Deschampsia caespitosa (L.) Beauv. - occasional; river shoreline

Elymus innovatus Beal - common; level grassland, aspen woodlands

L Festuca rubra L. - rare?; level grassland

Glyceria grandis S. Wats. ex A. Gray - occasional; slump impoundments in rolling aspen slump mosaic

Helictotrichon hookeri (Scribn.) Henr. - occasional; Hairy Wild Rye tableland grassland

Hordeum jubatum L. - occasional; river shoreline, cutlines, herb meadow

Koeleria macrantha (Ledeb.) - common; slope and level grasslands

M Phleum pratense L. - occasional; cutlines in aspen tableland woodland

Poa palustris L. - occasional; moist depressions in rolling aspen woodland

Poa pratensis L. - occasional; steep slope Wheat Grass grasslands

L Stipa columbiana Macoun - rare?; steep eroded Wheat Grass grasslands

Stipa curtiseta (A.S. Hitchc.) Barkworth - locally common; restricted to southerly-facing valley ridge lines

Stipa spartea Trin. var. curtiseta - common; steep south-facing grasslands

Stipa viridula Trin. - locally common; restricted to lower positions on south-facing grassland slopes

CYPERACEAE (Sedge Family)

Carex aquatilis Wahlenb. - locally common; abandoned channel, slump impoundments

Carex atherodes Spreng. - occasional; moist herb meadow

Carex crawfordii Fern. - occasional; wet depressions on cutlines in tableland in aspen and in abandoned channel

L Carex obtusata Lilj. - occasional; south-facing grassland slopes and ridges

E Carex retrorsa Schwein. - occasional; restricted to abandoned channel

Carex rostrata Stokes - occasional; slump impoundment

Carex siccata Dewey - rare?; Hairy Wild Rye tableland grassland

Eleocharis palustris (L.) R. & S. - occasional; abandoned beaver pond

Scirpus acutus Muhl. ex Bigel. - occasional; slump impoundment

Scirpus microcarpus Presl. - occasional; abandoned channel marsh

Scirpus validus Vahl - common; slump impoundment marsh

LEMNACEAE (Duckweed Family)

Lemna minor L. - occasional; sloughs in aspen - slump mosaic

JUNCACEAE (Rush Family)

Juncus balticus Willd. var. montanus Engelm. - occasional; river shoreline

Juncus bufonius L. - occasional; moist depressions in tableland aspen

M Juncus vaseyi Engelm. - occasional; moist depressions in tableland aspen

LILIACEAE (Lily Family)

Allium cernuum Roth - common; south-facing grassland slopes

Allium schoenoprasum L. - occasional; river bank

M Disporum trachycarpum Salisb. - occasional; alluvial poplar woodlands

Maianthemum canadense Desf. - common; alluvial spruce woodlands

Smilacina stellata (L.) Desf. - common; south-facing slope shrublands

ORCHIDACEAE (Orchid Family)

E Corallorhiza striata Lindl. - rare; aspen woodlands on north facing slopes

Habenaria viridis (L.) R.Br. - uncommon; moist woodlands

SALICACEAE (Willow)

Populus balsamifera L. - common; lower north-facing slopes, alluvial terrace, island

Populus tremuloides Michx. - common; tableland and upper valley slopes

Salix bebbiana Sarg. - occasional; moist depressions in aspen woodlands

Salix exigua Nutt. - common; river shoreline
Salix planifolia Pursh - common; upper north-facing slopes with aspen - spruce
Salix pseudomonticola Ball - occasional; aspen woodlands

BETULACEAE (Birch Family)
Alnus crispa (Ait.) Pursh - occasional; lower north-facing wooded slopes
Alnus tenuifolia Nutt. - common; river bank, alluvial shrubland
Betula papyrifera Marsh. - common; lower north-facing slopes, alluvial terrace and island

URTICACEAE
Urtica dioica L. - common; slump impoundments

SANTALACEAE (Sandalwood Family)
Commandra umbellata Nutt. - occasional; level Hairy Wild Rye grassland

POLYGONACEAE (Buckwheat Family)
Rumex crispus L. - occasional; slump impoundment
Rumex occidentalis S. Wats. - occasional; slump impoundment

CHENOPODIACEAE (Goosefoot Family)
Chenopodium gigantospermum Aellen - occasional; slump impoundment

CARYOPHYLLACEAE (Pink Family)
Cerastium arvense L. - occasional; level Hairy Wild Rye grassland
R,M,E Stellaria crispa Cham. & Schlecht - occasional; slump impoundment

RANUNCULACEAE (Crowfoot Family)
Actaea rubra (Ait.) Willd. - common; alluvial birch, spruce woods
Anemone cylindrica A. Gray - occasional; slope grassland
Anemone multifida Poir. - occasional; level grassland
Anemone patens L. - occasional; slope grassland
Clematis occidentalis (Hornem.) DC. - occasional; upper north facing slopes with aspen - spruce
Ranunculus abortivus L. - occasional; river shoreline
Ranunculus gmelinii DC. - occasional; slump impoundments
Ranunculus macounii Britt. - occasional; mature spruce alluvial woodlands
Thalictrum venulosum Trel. - occasional; moister positions in level shrubland

CRUCIFERAE (Mustard Family)
Arabis hirsuta (L.) Scop. - occasional; river bank

SAXIFRAGACEAE (Saxifrage Family)
Heuchera richardsonii R.Br. - uncommon; erosion slopes
Mitella nuda L. - common; alluvial mature spruce, birch woods

PARNASSIACEAE (Grass-of-Parnassus Family)
Parnassia palustris L. - occasional; alluvial poplar woodland

GROSSULARIACEAE (Currant or Gooseberry Family)
Ribes oxycanthoides L. - common; alluvial spruce woodland
Ribes triste Pall. - occasional; alluvial poplar woodlands

ROSACEAE (Rose Family)
Amelanchier alnifolia Nutt. - common; open aspen woodlands and drainage draws of slopes
Fragaria virginiana Duchesne - common; woodlands
L Geum aleppicum Jacq. - occasional?; mature spruce woodland
Geum macrophyllum Willd. - common; slump impoundment
Geum triflorum Pursh - occasional; level grassland, shrubland
Potentilla arguta Pursh - occasional; level Wild Rye grassland
Potentilla norvegica L. - occasional; slump impoundments
Prunus virginiana L. - common; slope shrublands, aspen woodlands
Rosa acicularis Lindl. - common; woodlands, slope grasslands
Rosa woodsii Lindl. - occasional; grassland slopes
Rubus arcticus L. - common; alluvial birch woodlands
Rubus idaeus L. - common; alluvial woodlands, level shrublands
Rubus parviflorus Nutt. - occasional; alluvial spruce woodlands
Rubus pubescens Raf. - occasional; moist aspen, poplar woodlands

LEGUMINOSAE (Pea Family)
Astragalus canadensis L. - occasional; moist open woodlands
Astragalus dasyglottis Fisch. ex DC. - rare; erosion slopes with Wheat Grass
Hedysarum boreale Nutt. - rare; restricted to eroded valley ridge line
Lathyrus ochroleucus Hook. - occasional; upper north-facing slopes with aspen - spruce
L Oxytropis deflexa (Pall.) DC. - uncommon; steep eroded slopes
Oxytropis splendens Dougl. ex Hook. - occasional; south-facing grassland slopes
I,M Trifolium hybridum L. - occasional; river shoreline and slump impoundment edge
Vicia americana Muhl. - common; aspen woodlands, level and slope grasslands

LINACEAE (Flax Family)
Linum lewisii Pursh - common; level and south-facing slope grasslands

BALSAMINACEAE (Touch-me-not Family)
L Impatiens sp. - rare?; mature spruce alluvial woodlands

VIOLACEAE (Violet Family)
Viola sp. - common; woodlands

CACTACEAE (Cactus Family)
Opuntia fragilis (Nutt.) Haw. - occasional; steep south-facing grasslands

ELAEAGNACEAE (Oleaster Family)
Elaeagnus commutata Bernh. ex Rydb. - occasional; limited, dry aspen - pine - lichen community on valley ridge
Shepherdia canadensis (L.) Nutt. - common; aspen woodlands

ONAGRACEAE (Evening Primrose Family)
Circaea alpina L. - occasional; mature alluvial woodlands
M Epilobium angustifolium L. - occasional; along cutlines in tableland aspen

HALORAGACEAE (Water-milfoil Family)
M Myriophyllum exalbescens Fern. - occasional; slump impoundment

HIPPURIDACEAE (Mare's-tail Family)
Hippuris vulgaris L. - locally common; abandoned beaver pond and slump impoundment

ARALIACEAE (Ginseng Family)
Aralia nudicaulis L. - common; alluvial woodland

UMBELLIFERAE (Carrot Family)
Cicuta maculata L. - occasional; wet meadow base of slope
D Lomatium foeniculaceum (Nutt.) Coult. & Rose - occasional; valley slope crest grassland

CORNACEAE (Dogwood Family)
Cornus canadensis L. - common; alluvial spruce woodland
Cornus stolonifera Michx. - common; river bank, alluvial terrace, island

PYROLACEAE (Wintergreen Family)
Orthilia secunda (L.) House - occasional; aspen woodlands
Pyrola asarifolia Michx. - common; moist aspen woodlands

PRIMULACEAE (Primrose Family)
Androsace septentrionalis L. - uncommon; slope grassland

GENTIANACEAE (Gentian Family)
Gentianella amarella (L.) Borner - occasional; slump impoundments, wet meadow

ASCLEPIADACEAE (Milkweed Family)
E,L Asclepias ovalifolia Dene. - uncommon?; steep eroded slope

BORAGINACEAE (Borage Family)
M Mertensia paniculata (Ait.) G. Don. - common; woodlands

LABIATAE (Mint Family)
Mentha arvensis L. - common; abandoned channel, slump impoundments, wet meadow
Monarda fistulosa L. - common; edge of shrubland - grassland transition on slopes
Scutellaria galericulata L. - occasional; wet meadow at base of slope
Stachys palustris L. - occasional; moist depressions in aspen woods

SCROPHULARIACEAE (Figwort Family)
Castilleja miniata Dougl. ex Hook. - occasional; wet herb meadow
Rhinanthus minor L. - occasional; on cutlines in level aspen
M Veronica scutellata L. - uncommon; wet meadow

OROBANCHACEAE (Broom-rape Family)
M,E Orobanche fasciculata Nutt. - rare; steep south-facing sage erosion slopes

RUBIACEAE (Madder Family)
M Galium boreale L. - common; valley slope woodlands
L Galium trifidum L. - uncommon?; mature spruce woodland
Galium triflorum Michx. - common; alluvial terrace and island woodlands

CAPRIFOLIACEAE (Honeysuckle Family)
Linnaea borealis L. - common; alluvial woodlands
Lonicera dioica L. - uncommon; moist alluvial shrubland

Symphoricarpos albus (L.) Blake - uncommon; grassland ridges
Symphoricarpos occidentalis Hook. - common; grassland slopes
Vibernum edule (Michx.) Raf. - common; alluvial woodlands

VALERIANACEAE (Valerian Family)

Valeriana dioica L. - occasional; moist depressions in aspen woods

CAMPANULACEAE (Bluebell Family)

Campanula rotundifolia L. - occasional; tableland shrubland - grassland

COMPOSITAE (Composite Family)

Achillea millefolium L. - common; grasslands, aspen woodlands
Achillea sibirica Ledeb. - occasional; river shoreline, slump impoundment, moist depressions in aspen woods
Antennaria parviflora Nutt. - occasional; restricted to dry pine - lichen community on valley ridge
Arnica cordifolia Hook. - occasional; woodlands
I Artemisia dracunculus L. - occasional; steep erosion slopes
I Artemisia frigida Willd. - common; steep grassland slopes
M,D Artemisia longifolia Nutt. - occasional; steep erosion slopes, river shoreline
I,L Artemisia ludoviciana Nutt. - uncommon?; steep eroded slopes
E Aster alpinus L. - rare; grassland ridge
Aster ciliolatus Lindl. - occasional; aspen woodlands
Aster conspicuus Lindl. - common; aspen woodlands
Aster laevis L. - occasional; steep south-facing grassland slopes
D Aster sibiricus L. - occasional; river shoreline
I,M Cirsium arvense (L.) Scop. - occasional; slump impoundment edge
Cirsium drummondii T. & G. - occasional; slump impoundments
I Crepis tectorum L. - occasional; slump impoundment edge, grassland slopes
Erigeron caespitosus Nutt. - occasional; steep south-facing grassland
Erigeron lonchophyllus Hook. - occasional; wet meadow base of slope
Erigeron philadelphicus L. - occasional; slump impoundment edge
M Lactuca pulchella (Pursh) DC. - occasional; along cutlines in level aspen woodland
Petasites palmatus (Ait.) A. Gray - uncommon; slump impoundment
Petasites sagittatus (Pursh) A. Gray - occasional; slump impoundment, moist depressions in aspen woodlands
Senecio eremophilus Richards. - uncommon; slump impoundments
Senecio pauperculus Michx. - occasional; along cutlines in tableland aspen
D Solidago gigantea Ait. - occasional; slump impoundment
Solidago spathulata DC. - common; south-facing grassland slopes
I Taraxacum officinale Weber - occasional; slump impoundment edge
Tragopogon dubius Scop. - occasional; slump impoundment

NOTES: Order and Nomenclature follow Moss (1983).

Abbreviations Used.

D - species with only a few recorded collections in region (as illustrated in distribution maps in Moss 1983)
E - extension of known recorded collection (as illustrated in distribution maps in Moss 1983)
I - introduced species as identified in Moss (1983)
L - reported previously, not noted during the present study
M - specimens mounted by K. Tannas and placed in Natural Areas Program Herbarium
R - rare species according to Packer and Bradley (1984)

APPENDIX 6.3

ANNOTATED LIST OF NON-VASCULAR PLANTS OF
THE SILVER VALLEY STUDY AREA

Mosses

DITRICHACEAE

Ceratodon purpureus - uncommon; along cutline in aspen woodland

DICRANACEAE

Dicranum fragilifolia - occasional; *Stipa* grasslands on valley slopes

Dicranum fuscescens - uncommon; epiphyte on trees, wood, moist woodlands

BRYACEAE

Bryum sp. - uncommon; edge of slough in rolling aspen woodland

Leptobryum pyriforme - uncommon; edge of slough in rolling aspen woodland

Pohlia nutans - occasional; woodlands

MNIACEAE

Plagiomnium cuspidatum - uncommon; slope grassland

AULACOMNIACEAE

Aulacomnium palustre - occasional; edge of slough in rolling woodland

ORTHOTRICACEAE

Orthotrichum speciosum - occasional; epiphyte on tree trunks

AMBLYSTEGIACEAE

Amblystegium serpens - occasional; edge of slough in rolling aspen woodland

Campylium stellatum - occasional; wet calcareous habitats, edge of slough in rolling aspen woodland

Drepanocladus aduncus - uncommon; in moist depressions in aspen woodland

Drepanocladus uncinatus - occasional; woodlands

THUIDIACEAE

Thuidium abietinum - uncommon; lodgepole pine - aspen woodland on sandy soil

BRACHYTHECIACEAE

Brachythecium salebrosum - occasional; woodlands on soil and trees

Eurhynchium pulchellum - common; moist woodlands on rotten logs, trees and roots

Tomenthynum nitens - occasional; moist depressions in aspen woodlands

ENTODONTACEAE

Pleurosium schreberi - occasional; mature alluvial woodlands

HYPNACEAE

Ptilium crista-castrensis - occasional; mature alluvial woodlands

RHYTIDIACEAE

Rhytidium rugosum - occasional; shrubland, grassland ridges and sandy lodgepole pine - aspen woodland

HYLOCOMNIACEAE

Hylocomnium splendens - occasional; mature alluvial woodlands

POLYTRICHACEAE

Polytrichum piliferum - uncommon; lodgepole pine - aspen woodland

TETRAPHIDACEAE

Tetraphis pellucida - occasional; slope grassland

Lichens

CLADONIACEAE

Cladina mitis - uncommon; lodgepole pine - aspen woodland on sandy soil

Cladina arbuscala - uncommon; dry lodgepole pine - aspen woodland

Cladonia cariosa - occasional; edge of slough in rolling aspen woodland

Cladonia coccifera - uncommon; dry lodgepole pine - aspen woodland

Cladonia chlorophaea - occasional; lodgepole pine - aspen woodland

Cladonia coniocraea - occasional; moist depressions in aspen woodland

Cladonia gracilis - occasional; woodlands
Cladonia multiformis - occasional; moist woodlands
Cladonia pyxidata - uncommon; dry lodgepole pine - aspen woodland

STEREOCAULACEAE
Stereocaulon tomentosum - uncommon; dry lodgepole pine - aspen woodland

PELTIGERACEAE
Peltigera canina - occasional; woodlands

NOTE: Nomenclature follows Conrad (1979) for mosses and Hale (1969) for lichens. All non-vasculars were identified by D. Vitt, University of Alberta.

APPENDIX 6.4

Vascular Plant Species Collected at Silver Valley that are Rare or are an Extension to the Recorded Collection Range.

Cinna latifolia

Carex retrorsa

Corallorhiza striata

Asclepias ovalifolia

Orobanche fasciculata

Aster alpinus

Stellaria crispa

SOURCE: Adapted from Moss (1983).

APPENDIX 6.5

VEGETATION STAND TABLES

COMPUTER PRINTOUT

VEGETATION STAND TABLE

NATURAL AREAS PROGRAM--ALBERTA ENERGY AND NATURAL RESOURCES RUN ON TUE JUL 16/85 16:09:40 PART 1 OF 2

VEGETATION PLOT NUMBER	jr84 030	jr84 031	jr84 032	jr84 033	jr84 034	jr84 035	jr84 036	jr84 037	jr84 038	jr84 039	jr84 040	jr84 041	jr84 042	jr84 043	jr84 044	jr84 045	jr84 046	jr84 047	jr84 048	jr84 049
PROJECT IDENTIFICATION	SILV ER	SILV ER	SILV ER	SILV ER	SILV ER	SILV ER	SILV ER	SILV ER	SILV ER	SILV ER	SILV ER	SILV ER	SILV ER	SILV ER	SILV ER	SILV ER	SILV ER	SILV ER	SILV ER	SILV ER
LEGAL	083 10W6	083 10W6	083 10W6	083 10W6	083 10W6	083 10W6	083 10W6	083 10W6	083 10W6	083 10W6	083 10W6	083 10W6	083 10W6	083 10W6	083 10W6	083 10W6	083 10W6	083 10W6	083 10W6	083 10W6
BIOGEOGRAPHICAL ZONE	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP	PP
IBP CODE																				
VEGETATION TYPE																				
LANDFORM	F LI	F LI	F II	F II	F LI	F LI	L SI	F LI	L SI	F II	F SI		F SI		F SI	L II	L II	L SI	F SI	F LI
ELEVATION (M)	365	385	385	365	365	365	520	594	565	580	535	535	380	400	490	400	490	489	505	565
SLOPE (DEGREES)	00	00	10	05	00	00	30	02	30	15	40	15	30	00	48	30	02	30	45	20
ASPECT			N	N		00	S	ON	SE	NE	S	S	NE	00	S	N	W	N	SW	S
SOIL																				
MOISTURE REGIME	6	7	6	5	6	6	2	4	2	4	1	3	5	7	1	4	3	5	1	3
DRAINAGE	4	5	4	3	4	5	1	2	2	3	2	3	4	6	1	3	2	3	1	2
SITE POSITION	7	7	5	4	7	7	2	7	2	2	3	3	4	6	3	4	3	3	3	3
STABILITY INDEX	3	3	3	3	3	3	4	3	4	3	6	4	3	4	6	3	3	3	6	3
MICROTOPOGRAPHY	2	1	2	2	2	2	2	1	1	1	1	1	2	1	2	2	2	2	2	2
ROCK	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
HUMUS	10	00	85	25	90	85	40	90	85	85	50	85	40	00	25	90	75	85	80	85
MINERAL SOIL	00	90	00	00	00	00	40	00	00	00	00	00	00	00	50	00	25	00	15	00
DEAD FALL	05	01	01	01	05	02	00	00	00	02	00	00	10	01	00	05	10	01	00	00
WATER	00	00	00	00	00	00	00	00	00	00	00	00	00	40	00	00	00	00	00	00
TOTAL UNVEGETATED	00	00	02	00	00	00	40	01	45	15	30	00	10	15	75	10	20	02	45	00
TREE CANOPY I	50	00	40	50	50	10	00	00	00	25	00	00	05	00	00	55	05	03	00	00
TREE CANOPY II	01	00	06	00	.5	60	00	00	00	00	00	00	21	00	00	05	23	11	00	00
SHRUB CANOPY I	03	47	05	02	.5	00	00	00	00	01	00	00	02	00	00	06	00	07	00	00
SHRUB CANOPY II	16	89	04	36	89	31	00	72	00	53	00	55	15	00	00	11	09	08	00	08
HERB-DWARF SHRUB	93	51	88	46	04	76	51	20	71	23	65	30	35	61	26	29	13	53	47	72
BRYOID	02	00	02	.1	00	00	00	00	00	.1	00	00	.5	00	00	.1	07	05	.1	.5

University of Alberta

VEGETATION STAND TABLE

NATURAL AREAS PROGRAM--ALBERTA ENERGY AND NATURAL RESOURCES RUN ON TUE JUL 16/85 16:09:40 PART 2 OF 2

VEGETATION PLOT NUMBER	jr84 050	jr84 051	jr84 052	jr84 053	jr84 054	jr84 058	jr84 059	jr84 060	jr84 061
PROJECT IDENTIFICATION	SILV ER	SILV ER	SILV ER	SILV ER	SILV ER	SILV ER	SILV ER	SILV ER	SILV ER
LEGAL	083 10W6	083 10W6	083 10W6	083 10W6	083 10W6	083 10W6	083 10W6	083 10W6	083 10W6
BIOGEOGRAPHICAL ZONE	PP	PP	PP	PP	PP	PP	PP	PP	PP
IBP CODE									
VEGETATION TYPE									
LANDFORM	F SI	F SI	F II	F II	F LI	L LI	L II	L LI	L SI
ELEVATION (M)	549	565	550	594	610	640	625	625	535
SLOPE (DEGREES)	35	40	25	20	00	00	30	00	25
ASPECT	S	SE	SW	SW	00	00	S	00	S
SOIL									
MOISTURE REGIME	2	1	3	2	3	5	3	6	2
DRAINAGE	1	2	1	1	3	4	2	4	1
SITE POSITION	3	2	2	1	7	7	2	7	1
STABILITY INDEX	6	6	4	4	4	3	4	3	4
MICROTOPOGRAPHY	1	2	2	2	1	2	2	2	1
ROCK	00	00	00	00	00	00	00	00	00
HUMUS	85	50	85	40	85	50	50	60	75
MINERAL SOIL	00	30	00	20	00	00	35	00	00
DEAD FALL	00	00	00	00	00	01	00	5	00
WATER	00	00	00	00	00	00	00	00	00
TOTAL UNVEGETATED	20	30	00	35	01	02	15	00	50
TREE CANOPY I	00	00	00	00	00	02	00	05	00
TREE CANOPY II	00	00	00	00	00	45	00	40	00
SHRUB CANOPY I	00	00	00	00	00	25	00	12	00
SHRUB CANOPY II	00	00	06	00	06	07	01	32	00
HERB-DWARF SHRUB	82	60	89	65	87	38	58	61	54
BRYOID	00	00	00	05	00	01	00	00	00

$signoff

LEVEL	ZONE	ASSC	TYPE
ECOSYM UNIT	PRPARK	1	

TRIAL GROUP #1/1

PRESENCE (%P), MEAN COVER (MC), PERCENT COVER (%C)

PUBLIC LANDS
EDMONTON, ALBERTA
12:55:47 AUG 16, 1985
TABLE 1 PAGE 1

PLOT NUMBER	AVERAGE VALUE		JR84 030	JR84 031	JR84 032	JR84 033	JR84 034	JR84 035	JR84 036	JR84 037	JR84 038	JR84 039	JR84 040	JR84 041	JR84 042	JR84 043	JR84 044
NUMBER OF SPECIES PER PLOT	19.6		27	21	25	17	24	21	7	22	12	21	6	18	29	38	5
SPECIES	%P	MC	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C
A1 LAYER																	
1 Populus tremuloides	17.2	2.8				50						25					
2 Betula neoalaskana(papyrif	13.8	2.3			40	.5									.5		
3 Picea glauca	13.8	2.3	50					10							05		
4 Populus balsamifera ssp. t	10.3	2.8	.5				50										
5 Pinus contorta	6.9	0.2															
A2 LAYER																	
Populus tremuloides	17.2	3.8													01		
Betula neoalaskana(papyrif	10.3	2.1			01			60									
6 Alnus tenuifolia	10.3	0.4			05			.5									
Picea glauca	10.3	0.1	01				.5										
Populus balsamifera ssp. t	6.9	0.9													20		
Pinus contorta	3.4	0.0															
B1 LAYER																	
Alnus tenuifolia	17.2	0.3	01	01			.5								01		
7 Salix bebbiana	10.3	0.6		01		.5											
Populus tremuloides	10.3	0.4				.5											
8 Alnus crispa	10.3	0.1													.5		
9 Cornus stolonifera	6.9	1.6	02	45													
10 Salix planifolia	6.9	0.5															
Populus balsamifera ssp. t	6.9	0.1				.5											
Picea glauca	6.9	0.0				.5											
11 Amelanchier alnifolia	3.4	0.0										.5					
Betula neoalaskana(papyrif	3.4	0.0													.5		
12 Salix pseudomonticola	3.4	0.0				.5											
13 Salix sp.	3.4	0.0										.5					
B2 LAYER																	
14 Shepherdia canadensis	37.9	4.5				20				40		15		20	01		
Cornus stolonifera	34.5	5.7	05	45	01	01	85	20							01		
15 Rosa woodsii	27.6	3.9		35		15	01			30		20		10	01		
16 Viburnum edule	27.6	1.5	.5	05			.5					15			10		
17 Ribes oxyacanthoides	27.6	0.2		.5	.5		.5	01		.5					01		
Amelanchier alnifolia	17.2	1.1								01				25			
18 Rubus idaeus(strigosus)	17.2	0.7	15	02	01		01			.5							
19 Rosa acicularis	13.8	0.6						10									
Alnus tenuifolia	10.3	0.1			01		.5										
20 Lonicera dioica	10.3	0.1	01	02	.5												
21 Prunus virginiana	10.3	0.1								.5							
Populus tremuloides	6.9	0.2															
22 Elaeagnus commutata	6.9	0.1															
Picea glauca	6.9	0.1				.5									01		
Salix sp.	6.9	0.1					.5										
23 Symphoricarpos occidentali	3.4	0.1										02					
Alnus crispa	3.4	0.0															
Betula neoalaskana(papyrif	3.4	0.0															
Populus balsamifera ssp. t	3.4	0.0										01					
Salix bebbiana	3.4	0.0															
Salix planifolia	3.4	0.0															

LEVEL	ZONE	ASSC	TYPE
ECOSYM UNIT	PRPARK	1	

TRIAL GROUP #1/1

PRESENCE (%P), MEAN COVER (MC), PERCENT COVER (%C)

PUBLIC LANDS
EDMONTON, ALBERTA
12:55:47 AUG 16, 1985
TABLE 1 PAGE 2

PLOT NUMBER	AVERAGE VALUE		JR84 030	JR84 031	JR84 032	JR84 033	JR84 034	JR84 035	JR84 036	JR84 037	JR84 038	JR84 039	JR84 040	JR84 041	JR84 042	JR84 043	JR84 044
NUMBER OF SPECIES PER PLOT	19.6		27	21	25	17	24	21	7	22	12	21	6	18	29	38	5
SPECIES	%P	MC	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C
C LAYER																	
24 Vicia americana(spars foli	72.4	0.8		.5		01			.5	.5	.5	02	01	01			.1
Symphoricarpos occide tali	41.4	2.2		.5						05	35	01		01	.5	.5	
25 Galium boreale	41.4	0.7								02				01	.5		
26 Koeleria macrantha(cr tat	37.9	3.5							40	.5	05		20				.5
27 Allium cernuum	37.9	0.5							05	.5	01		.5				
28 Artemisia frigida	31.0	3.1							05		02		25				01
Rosa acicularis	31.0	1.1						05			02						
29 Achillea millefolium	31.0	0.2								01				.5			
30 Equisetum arvense	27.6	7.0	85	40	75		.5								01	.5	
31 Aralia nudicaulis	27.6	2.4				.5	.5	05				02			25		
Rosa woodsii	27.6	1.8		05		10				01							
32 Fragaria virginiana	27.6	0.5	.5					01				.5			.5		
Viburnum edule	27.6	0.2			.5		.1					.5			01		
Amelanchier alnifolia	24.1	3.8								5				05			
Picea glauca	24.1	0.1	.5		1	.1		.5							01		
33 Elymus innovatus	20.7	3.8				30				05							
34 Agropyron dasystachyum	20.7	1.6							5								.5
Ribes oxyacanthoides	20.7	0.1	.5	.5	.5			.5								.1	
35 Stipa curtiseta(spartea)	17.2	4.7									25						
36 Agropyron trachycaulum v.	17.2	2.8											20			.5	25
37 Calamagrostis canadensis	17.2	2.2		02												02	
38 Agropyron trachycaulum v.	17.2	0.3												01			
39 Linnaea borealis	17.2	0.2					.5								01		
40 Aster conspicuus	17.2	0.1										.5		.5			
41 Cornus canadensis	17.2	0.1			.1			.5				01					
42 Galium triflorum	17.2	0.1	01		.5		.5	01									
43 Linum lewisii	17.2	0.1							1								
Shepherdia canadensis	17.2	0.1										.5			.5		
44 Circaea alpina	13.8	1.1	02		10		.1	20									
45 Mertensia paniculata	13.8	0.7	.5			05		.5				15					
46 Grass sp.	13.8	0.2										.5			01		
47 Mentha arvensis	13.8	0.2								02				.5		03	
48 Smilacina stellata	13.8	0.2												01			
49 Crepis tectorum	13.8	0.1														.5	
50 Mitella nuda	13.8	0.1	.5		.5										01		
51 Monarda fistulosa	13.8	0.1								.1				03			
52 Rubus pubescens	13.8	0.1	.5		.5							01			02		
53 Rubus arcticus(acaulis)	10.3	0.6															
54 Agropyron sp.	10.3	0.4								.5	01						
55 Epilobium sp.	10.3	0.1	.5					01									
56 Lathyrus ochroleucus	10.3	0.1															
57 Poa sp.	10.3	0.1			01					.5							
Prunus virginiana	10.3	0.1														.5	
Rubus idaeus(strigosus)	10.3	0.1		.5			01	.5									
58 Solidago spathulata(decumb	10.3	0.1															
59 Actaea rubra	10.3	0.0	.1		.5										.5		
60 Opuntia fragilis	10.3	0.0							.1				.1				

University of Alberta

LEVEL	ZONE	ASSC	TYPE
ECOSYM UNIT	PRPARK	1	

TRIAL GROUP #1/1

PRESENCE (%P), MEAN COVER (MC), PERCENT COVER (%C)

PUBLIC LANDS
EDMONTON, ALBERTA
12:55:47 AUG 16, 1985
TABLE 1 PAGE 3

PLOT NUMBER	AVERAGE VALUE		JR84 030	JR84 031	JR84 032	JR84 033	JR84 034	JR84 035	JR84 036	JR84 037	JR84 038	JR84 039	JR84 040	JR84 041	JR84 042	JR84 043	JR84 044
NUMBER OF SPECIES PER PLOT	19.6		27	21	25	17	24	21	7	22	12	21	6	18	29	38	5
SPECIES	%P	MC	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C
61 Orthilia secunda(Pyrola se	10.3	0.0										.5			.5		
62 Equisetum pratense	6.9	1.4						40									
63 Stipa viridula	6.9	1.1												.5			
64 Astragalus dasyglottis(agr	6.9	0.2															
65 Campanula rotundifolia	6.9	0.1								.5							
66 Symphoricarpos albus	6.9	0.1															
67 Achillea sibirica	6.9	0.0														.5	
68 Anemone sp.	6.9	0.0								.5						.5	
69 Bromus anomalus	6.9	0.0												.5			
70 Bromus ciliatus	6.9	0.0		.5													
71 Disporum trachycarpum	6.9	0.0					.1								.1		
72 Dryopteris carthusiana(spi	6.9	0.0	.1					.5									
73 Gentiana amarella	6.9	0.0												.5			
74 Geum triflorum	6.9	0.0								.5							
75 Gymnocarpium dryopteris	6.9	0.0			.1		.1										
76 Maianthemum canadense	6.9	0.0					.5	.5									
77 Orobanche fasciculata	6.9	0.0															
78 Petasites sagittatus	6.9	0.0														.5	
79 Poa palustris	6.9	0.0														.5	
80 Solidago gigantea	6.9	0.0														.5	
81 Stellaria sp.	6.9	0.0														.1	
82 Thalictrum venulosum	6.9	0.0			.5												
83 GYROTEN	3.4	1.7															
84 Carex aquatilis	3.4	1.0														30	
85 Apocynum cannabinum(sibiri	3.4	0.5												15			
86 Scirpus validus	3.4	0.3														10	
87 Aster sp.	3.4	0.2															
Elaeagnus commutata	3.4	0.2															
88 Hordeum jubatum ssp. xint.	3.4	0.2														05	
89 Carex sp.	3.4	0.1												02			
90 Typha latifolia	3.4	0.1														04	
91 Agoseris sp.	3.4	0.0														.5	
92 Agropyron repens	3.4	0.0		.5													
Alnus tenuifolia	3.4	0.0		.5													
93 Anemone cylindrica	3.4	0.0															
94 Anemone multifida	3.4	0.0															
95 Antennaria aprica(parviflo	3.4	0.0															
96 Artemisia dracunculus	3.4	0.0															
97 Aster laevis	3.4	0.0															
98 Beckmannia syzigachne	3.4	0.0														.5	
Betula neoalaskana(papyrif	3.4	0.0														.5	
99 Calamagrostis inexpansa	3.4	0.0														.5	
100 Carex rostrata	3.4	0.0														.5	
101 Cerastium arvense	3.4	0.0															
102 Cinna latifolia	3.4	0.0	.5														
103 Cirsium arvense	3.4	0.0														.1	
104 Clematis occidentalis(vert	3.4	0.0															
105 Eleocharis palustris	3.4	0.0														.5	

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LEVEL	ZONE	ASSC	TYPE
ECOSYM UNIT	PRPARK	1	

TRIAL GROUP #1/1

PRESENCE (%P), MEAN COVER (MC), PERCENT COVER (%C)

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PLOT NUMBER	AVERAGE VALUE		JR84 030	JR84 031	JR84 032	JR84 033	JR84 034	JR84 035	JR84 036	JR84 037	JR84 038	JR84 039	JR84 040	JR84 041	JR84 042	JR84 043	JR84 044
NUMBER OF SPECIES PER PLOT	19.6		27	21	25	17	24	21	7	22	12	21	6	18	29	38	5
SPECIES	%P	MC	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C
106 Equisetum hyemale	3.4	0.0					.1										
107 Equisetum palustre	3.4	0.0			.5												
108 Erigeron philadelphicus	3.4	0.0														.5	
109 Geum macrophyllum	3.4	0.0														01	
110 Helictotrichon hookeri	3.4	0.0															
111 Hippuris vulgaris	3.4	0.0														.5	
112 Juniperus communis	3.4	0.0															
113 Lemna minor	3.4	0.0														.5	
114 Lomatium foeniculaceum	3.4	0.0															
Lonicera dioica	3.4	0.0															
115 Myriophyllum exalbescens	3.4	0.0														.5	
116 Oxytropis splendens	3.4	0.0															
117 Parnassia palustris	3.4	0.0					.1										
118 Petasites palmatus	3.4	0.0															
Pinus contorta	3.4	0.0															
119 Poa pratensis	3.4	0.0															
Populus balsamifera ssp. t	3.4	0.0		.5													
Populus tremuloides	3.4	0.0															
120 Potamogeton pusillus	3.4	0.0														.5	
121 Potentilla arguta	3.4	0.0															
122 Pyrola asarifolia	3.4	0.0										.5					
123 Ranunculus macounii	3.4	0.0	.5														
124 Ranunculus sp.	3.4	0.0															
125 Ribes triste	3.4	0.0					.1										
126 Rubus parviflorus	3.4	0.0						.5									
127 Rumex sp.	3.4	0.0														.1	
Salix bebbiana	3.4	0.0														.5	
128 Scirpus acutus	3.4	0.0														.5	
129 Scutellaria galericulata	3.4	0.0														.5	
130 Stachys palustris	3.4	0.0															
131 Stipa sp.	3.4	0.0															
132 Taraxacum officinale	3.4	0.0															
133 Thalictrum sp.	3.4	0.0														.5	
134 Tragopogon dubius	3.4	0.0															
135 Trifolium hybridum	3.4	0.0														.5	
136 Urtica dioica ssp. grac.(g	3.4	0.0	.5													.5	
137 Vaccinium myrtilloides	3.4	0.0															
138 Vaccinium sp.	3.4	0.0					.1										
139 Valeriana dioica ssp. syl.	3.4	0.0															
140 Viola sp.	3.4	0.0		.5													
EX LAYER																	
141 Cladonia sp.	13.8	0.2															
142 Pleurozium schreberi	10.3	0.2			.5										.5		
143 Peltigera sp.	10.3	0.0	.5		.5												
144 Rhytidium rugosum	6.9	0.0															
145 Dicranella sp.	3.4	0.1															
146 Cladonia chlorophaea	3.4	0.0															
147 Cladonia coccifera	3.4	0.0															

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LEVEL	ZONE	ASSC	TYPE
ECOSYSTEM UNIT	PRPARK	1	

TRIAL GROUP #1/1

PRESENCE (%P), MEAN COVER (MC), PERCENT COVER (%C)

PUBLIC LANDS
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PLOT NUMBER	AVERAGE VALUE		JR84 030	JR84 031	JR84 032	JR84 033	JR84 034	JR84 035	JR84 036	JR84 037	JR84 038	JR84 039	JR84 040	JR84 041	JR84 042	JR84 043	JR84 044
NUMBER OF SPECIES PER PLOT	19.6		27	21	25	17	24	21	7	22	12	21	6	18	29	38	5
SPECIES	%P	MC	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C
148 Cladonia coniocraea	3.4	0.0									.5						
149 Cladonia gracilis	3.4	0.0															
150 Cladonia mitis	3.4	0.0															
151 Cladonia pyxidata	3.4	0.0															
152 Dicranum fragilifolium	3.4	0.0									.5						
153 Drepanocladus aduncus	3.4	0.0															
154 Drepanocladus uncinatus	3.4	0.0															
155 Eurhynchium pulchellum	3.4	0.0															
156 Hylocomium splendens	3.4	0.0			.5												
157 Mnium sp.	3.4	0.0	.5														
158 Plagiomnium cuspidatum	3.4	0.0									.5						
159 Polytrichum sp.	3.4	0.0	.5														
160 Polytrichum piliferum	3.4	0.0															
161 Ptilium crista-castrensis	3.4	0.0															
162 Stereocaulon sp.	3.4	0.0															
163 Tetraphis pellucida	3.4	0.0									.5						
164 Thuidium abietinum	3.4	0.0															
165 Tomenthypnum nitens	3.4	0.0															

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LEVEL	ZONE	ASSC	TYPE
ECOSYM UNIT	PRPARK	1	

TRIAL GROUP #1/1

PRESENCE (%P), MEAN COVER (MC), PERCENT COVER (%C)

PUBLIC LANDS
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PLOT NUMBER	JR84 045	JR84 046	JR84 047	JR84 048	JR84 049	JR84 050	JR84 051	JR84 052	JR84 053	JR84 054	JR84 058	JR84 059	JR84 060	JR84 061
NUMBER OF SPECIES PER PLOT	18	40	33	13	18	8	12	15	16	26	31	9	23	14
SPECIES	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C
A1 LAYER														
1 Populus tremuloides		.5	.1										05	
2 Betula neoalaskana(papyrif	25													
3 Picea glauca			03											
4 Populus balsamifera ssp. t	30													
5 Pinus contorta		05									02			
A2 LAYER														
Populus tremuloides		20	10								45		35	
Betula neoalaskana(papyrif			01											
6 Alnus tenuifolia	05													
Picea glauca		02												
Populus balsamifera ssp. t													05	
Pinus contorta		01												
B1 LAYER														
Alnus tenuifolia	05													
7 Salix bebbiana											15			
Populus tremuloides			01								10			
8 Alnus crispa	01		01											
9 Cornus stolonifera														
10 Salix planifolia			05										10	
Populus balsamifera ssp. t													02	
Picea glauca			.1											
11 Amelanchier alnifolia														
Betula neoalaskana(papyrif														
12 Salix pseudomonticola														
13 Salix sp.														
B2 LAYER														
14 Shepherdia canadensis		01			01			02		05	01		25	
Cornus stolonifera	05										.5		01	
15 Rosa woodsii								01						
16 Viburnum edule	05		03										05	
17 Ribes oxyacanthoides		.5	01											
Amelanchier alnifolia		.5			05			01						
18 Rubus idaeus(strigosus)														
19 Rosa acicularis			02							01	05			
Alnus tenuifolia	01													
20 Lonicera dioica														
21 Prunus virginiana					01			02						
Populus tremuloides		05			01									
22 Elaeagnus commutata		.5										01		
Picea glauca														
Salix sp.													01	
23 Symphoricarpos occidentali														
Alnus crispa			01											
Betula neoalaskana(papyrif		.5												
Populus balsamifera ssp. t														
Salix bebbiana											.5			
Salix planifolia			01											

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LEVEL	ZONE	ASSC	TYPE
ECOSYM UNIT	PRPARK	1	

TRIAL GROUP #1/1

PRESENCE (%P), MEAN COVER (MC), PERCENT COVER (%C)

PUBLIC LANDS
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PLOT NUMBER	JR84 045	JR84 046	JR84 047	JR84 048	JR84 049	JR84 050	JR84 051	JR84 052	JR84 053	JR84 054	JR84 058	JR84 059	JR84 060	JR84 061
NUMBER OF SPECIES PER PLOT	18	40	33	13	18	8	12	15	16	26	31	9	23	14
SPECIES	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C
C LAYER														
24 Vicia americana(sparsifoli		.5	.5		03	05	.5	02	.5	03	.5	.5	.5	.5
Symphoricarpos occidentali			01		01			01				15		01
25 Galium boreale	.5	.5	01		04			03	.5	05	01		01	
26 Koeleria macrantha(cristat		.1		25		05	05		01					.5
27 Allium cernuum				.1	.5	01	.1		05	.5				.5
28 Artemisia frigida				10		05	20		20					.5
Rosa acicularis		05	10		05					02	01	01	01	
29 Achillea millefolium					01		.5	01		01	.5	.5		.1
30 Equisetum arvense											.5		.5	
31 Aralia nudicaulis	25	.5	10											
Rosa woodsii				.1				25	10			01		.1
32 Fragaria virginiana	01		07								02		01	
Viburnum edule	01	.5	01										02	
Amelanchier alnifolia					50		.5	50	02					01
Picea glauca		.5	.5											
33 Elymus innovatus		02	02					.5		70				
34 Agropyron dasystachyum				20		04	01		20					
Ribes oxyacanthoides			01											
35 Stipa curtiseta(spartea)		.1				60	01							50
36 Agropyron trachycaulum v.	.5											35		
37 Calamagrostis canadensis											10		50	.5
38 Agropyron trachycaulum v.					01		.5	05		.5				
39 Linnaea borealis	.5	.1	05											
40 Aster conspicuus		.1			02			.5						
41 Cornus canadensis											.5		01	
42 Galium triflorum	.5													
43 Linum lewisii				.5	.5	02			01					
Shepherdia canadensis		.5									.5		01	
44 Circaea alpina														
45 Mertensia paniculata														
46 Grass sp.			02										01	
47 Mentha arvensis											.5			
48 Smilacina stellata					03			01		01				
49 Crepis tectorum				02					.1	.5				
50 Mitella nuda			.5											
51 Monarda fistulosa					.5					.5				
52 Rubus pubescens														
53 Rubus arcticus(acaulis)	03		05								10			
54 Agropyron sp.											10			
55 Epilobium sp.											01			
56 Lathyrus ochroleucus			.5							.5			01	
57 Poa sp.										.5				
Prunus virginiana							01					.5		
Rubus idaeus(strigosus)														
58 Solidago spathulata(decumb		01		.1	.5									
59 Actaea rubra														
60 Opuntia fragilis									.1					

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LEVEL	ZONE	ASSC	TYPE
ECOSYM UNIT	PRPARK	1	

TRIAL GROUP #1/1

PRESENCE (%P), MEAN COVER (MC), PERCENT COVER (%C)

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PLOT NUMBER	JR84 045	JR84 046	JR84 047	JR84 048	JR84 049	JR84 050	JR84 051	JR84 052	JR84 053	JR84 054	JR84 058	JR84 059	JR84 060	JR84 061
NUMBER OF SPECIES PER PLOT	18	40	33	13	18	8	12	15	16	26	31	9	23	14
SPECIES	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C
61 Orthilia secunda(Pyrola se	.1													
62 Equisetum pratense	.5													
63 Stipa viridula							30							
64 Astragalus dasyglottis(agr				.1					05					
65 Campanula rotundifolia										01				
66 Symphoricarpos albus		.5							01					
67 Achillea sibirica											.5			
68 Anemone sp.														
69 Bromus anomalus								.5						
70 Bromus ciliatus													.5	
71 Disporum trachycarpum														
72 Dryopteris carthusiana(spi														
73 Gentiana amarella														.5
74 Geum triflorum										.5				
75 Gymnocarpium dryopteris														
76 Maianthemum canadense														
77 Orobanche fasciculata				.1		.1								
78 Petasites sagittatus											.5			
79 Poa palustris										.5				
80 Solidago gigantea											.5			
81 Stellaria sp.										.5				
82 Thalictrum venulosum										.5				
83 GYROTEN														5
84 Carex aquatilis														
85 Apocynum cannabinum(sibiri														
86 Scirpus validus														
87 Aster sp.			06											
Elaeagnus commutata												05		
88 Hordeum jubatum ssp. xint.														
89 Carex sp.														
90 Typha latifolia														
91 Agoseris sp.														
92 Agropyron repens														
Alnus tenuifolia														
93 Anemone cylindrica														.5
94 Anemone multifida										.5				
95 Antennaria aprica(parviflo		.5												
96 Artemisia dracunculus				.1										
97 Aster laevis							.5							
98 Beckmannia syzigachne														
Betula neoalaskana(papyrif														
99 Calamagrostis inexpansa														
100 Carex rostrata														
101 Cerastium arvense										.5				
102 Cinna latifolia														
103 Cirsium arvense														
104 Clematis occidentalis(vert			01											
105 Eleocharis palustris														

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LEVEL	ZONE	ASSC	TYPE
ECOSYM UNIT	PRPARK	1	

TRIAL GROUP #1/1

PRESENCE (%P), MEAN COVER (MC), PERCENT COVER (%C)

PUBLIC LANDS
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PLOT NUMBER	JR84 045	JR84 046	JR84 047	JR84 048	JR84 049	JR84 050	JR84 051	JR84 052	JR84 053	JR84 054	JR84 058	JR84 059	JR84 060	JR84 061
NUMBER OF SPECIES PER PLOT	18	40	33	13	18	8	12	15	16	26	31	9	23	14
SPECIES	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C
106 Equisetum hyemale														
107 Equisetum palustre														
108 Erigeron philadelphicus														
109 Geum macrophyllum														
110 Helictotrichon hookeri										.5				
111 Hippuris vulgaris														
112 Juniperus communis		.1												
113 Lemna minor														
114 Lomatium foeniculaceum									.1					
Lonicera dioica													.5	
115 Myriophyllum exalbescens														
116 Oxytropis splendens									.5					
117 Parnassia palustris														
118 Petasites palmatus											.5			
Pinus contorta		.5												
119 Poa pratensis														.5
Populus balsamifera ssp. t														
Populus tremuloides		.5												
120 Potamogeton pusillus														
121 Potentilla arguta										.5				
122 Pyrola asarifolia														
123 Ranunculus macounii														
124 Ranunculus sp.										.5				
125 Ribes triste														
126 Rubus parviflorus														
127 Rumex sp.														
Salix bebbiana														
128 Scirpus acutus														
129 Scutellaria galericulata														
130 Stachys palustris											.5			
131 Stipa sp.										.5				
132 Taraxacum officinale														
133 Thalictrum sp.										.5				
134 Tragopogon dubius														
135 Trifolium hybridum														
136 Urtica dioica ssp. grac.(g														
137 Vaccinium myrtilloides													.5	
138 Vaccinium sp.														
139 Valeriana dioica ssp. syl.											.5			
140 Viola sp.														
EX LAYER														
141 Cladonia sp.		.5	.1	.1					05					
142 Pleurozium schreberi			05											
143 Peltigera sp.				.1										
144 Rhytidium rugosum		.5			.5									
145 Dicranella sp.		03												
146 Cladonia chlorophaea		.5												
147 Cladonia coccifera		.5												

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LEVEL	ZONE	ASSC	TYPE
ECOSYM UNIT	PRPARK	1	

TRIAL GROUP #1/1

PRESENCE (%P), MEAN COVER (MC), PERCENT COVER (%C)

PUBLIC LANDS
EDMONTON, ALBERTA
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PLOT NUMBER	JR84 045	JR84 046	JR84 047	JR84 048	JR84 049	JR84 050	JR84 051	JR84 052	JR84 053	JR84 054	JR84 058	JR84 059	JR84 060	JR84 061
NUMBER OF SPECIES PER PLOT	18	40	33	13	18	8	12	15	16	26	31	9	23	14
SPECIES	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C	%C
148 Cladonia coniocraea														
149 Cladonia gracilis		.5												
150 Cladonia mitis		01												
151 Cladonia pyxidata		.5												
152 Dicranum fragilifolium														
153 Drepanocladus aduncus											.5			
154 Drepanocladus uncinatus											.5			
155 Eurhynchium pulchellum											.5			
156 Hylocomium splendens														
157 Mnium sp.														
158 Plagiomnium cuspidatum														
159 Polytrichum sp.														
160 Polytrichum piliferum		.5												
161 Ptilium crista-castrensis			.5											
162 Stereocaulon sp.		.5												
163 Tetraphis pellucida														
164 Thuidium abietinum		.5												
165 Tomenthypnum nitens											.5			

T=0.115 DR=0 $.11, $.15T

$signoff

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APPENDIX 7.1

SUMMARY OF ALBERTA WILDLIFE SERVICE AERIAL UNGULATE SURVEYS
(1968-1984)

	Moose					Mule Deer			
	Cow	Calf	Bull	Unknown	Total	Doe	Buck	Unknown	Total
1984	3	2	1	1	7				
1981	1	1		2	4				
1979	8	6	1		15	2			2
1977	2	3	1		6		1	6	7
1976	1	1	1	9	12				
1973					0				
1968	2	2		6	10				
Total	17	15	4	18	54	2	1	6	9
*Avg/Yr					9				1.5

SOURCE: Alberta Energy and Natural Resources, Fish and Wildlife Service (1968, 1973, 1976, 1977, 1979, 1981, 1984).

NOTE: Surveys included a much larger area than the Silver Valley study area, but only sightings within the study area are recorded in this table.

*For the average number of sightings per year of survey 1973 was omitted as there was extremely poor survey conditions (i.e. no snow cover).

APPENDIX 7.2

ANNOTATED LIST OF MAMMALS (OR SIGN) OBSERVED AT THE SILVER VALLEY STUDY AREA, JUNE - SEPT. 1984

Rabbits and Hares (Leporidae)

Snowshoe Hare (Lepus americanus) - common; woodlands; sign observed (browsed shrubs, pellets)

Squirrels (Sciuridae)

American Red Squirrel (Tamiasciurus hudsonicus) - uncommon; restricted to spruce and mixed woodlands; sign observed (cone scales, middens) and heard

Beavers (Castoridae)

American Beaver (Castor canadensis) - uncommon; slump impoundments (abandoned lodges) and bank den along Peace River, cuttings observed

Rats, Mice, Voles (Muridae)

Bushy-tailed Wood Rat (Neotoma cinerea) - uncommon; bedrock outcrops on steep slope grasslands (pellets observed on rock)

Dogs (Canidae)

Coyote (Canis latrans) - uncommon - common; widespread; tracks observed

Wolf (Canis lupus) - uncommon; widespread; tracks observed

Bears (Ursidae)

American Black Bear (Ursus americanus) - common; shrublands and ridges; several sightings, sign observed included dug anthills, scats

Deer (Cervidae)

Mule Deer (Odocoileus hemionus) - common; several sightings, signs observed included tracks, pellets, rubbing tree, shed antler, browsed shrubs

Moose (Alces alces) - common; woodland; three sighted; signs observed included browsed shrubs, pellet groups, tracks

NOTE: Order and nomenclature follows Banfield (1974).

APPENDIX 7.3

ANNOTATED LIST OF BIRDS OBSERVED AT
THE SILVER VALLEY STUDY AREA, JUNE - SEPT. 1984

Hawks (Order Falconiformes)

Red-tailed Hawk (Buteo jamaicensis). fc. 1 sighted - wooded creek valleys.

Broad-winged Hawk (Buteo platypterus). uc. 1 sighted soaring above site, July 22.

American Kestrel (Falco sparverius). fc. 1 sighted in rolling aspen on July 24.

Gallinaceous Birds (Order Galliformes)

Ruffed Grouse (Bonasa umbellus). fc. 1 heard - aspen woodland.

Herons and their Allies (Order Ciconiiformes)

Great Blue Heron (Ardea herodias). uc. 1 sighted - along creek July 22.

Shorebirds and Gulls (Order Charadriiformes)

Spotted Sandpiper (Actitis macularia). fc. along Peace River shoreline.

Caspian Tern (Sterna caspia). r. 1 sighted on Peace River on July 23.

Owls (Order Strigiformes)

Barred Owl (Strix varia). uc. 1 heard - woodlands.

Goatsuckers (Order Caprimulgiformes)

Common Nighthawk (Chordeiles minor). uc. 1 sighted - diving during evening above site.

Woodpeckers (Order Piciformes)

Common Flicker (Colaptes auratus). fc. 1 sighted.

Pileated Woodpecker (Dryocopus pileatus). uc. tree holes noted - alluvial woodland.

Perching Birds (Order Passeriformes)

Eastern Kingbird (Tyrannus tyrannus). uc. 2 sighted - mixedwoods.

Least Flycatcher (Empidonax minimus). fc. 2 heard - aspen woodland.
Olive-sided Flycatcher (Nuttallornis borealis). fc. 2 heard aspen woodland.
Gray Jay (Perisoreus canadensis). uc. 1 sighted. aspen woodland edge.
Black-billed Magpie (Pica pica). uc. 1 sighted. aspen woodland edge, southeast corner of area.
Common Raven (Corvus corax). uc. 1 sighted. flying overhead.
American Crow (Corvus brachyrhynchos). uc. 1 sighted. aspen woodland along creek valley.
Black-capped Chickadee (Parus atricapillus). fc. 2 heard. mixedwood and aspen woodland, lower slopes.
Boreal Chickadee (Parus hudsonicus). uc. 1 sighted. mixedwood along lower valley slopes.
Red-breasted Nuthatch (Sitta canadensis). uc. 1 sighted conifer - mixedwood along valley bottom.
American Robin (Turdus migratorius). c. 3 sighted. aspen woodland on tableland.
Hermit Thrush (Catharus guttatus). fc. 2 heard. aspen woodland on tableland.
Swainson's Thrush (Catharus ustalatus). c. 3 heard/sighted. aspen woodland.
Cedar Waxwing (Bombycilla cedrorum). c. 2 flocks sighted aspen - grassland edge.
Red-eyed Vireo (Vireo olivaceus). c. 8 sighted/heard. aspen and mixedwoods on tableland and valley slopes.
Warbling Vireo (Vireo gilvus). uc. 1 heard. poplar woodland on relict island.
Black and White Warbler (Mniotilta varia). uc. 1 sighted. aspen woodland on tableland.
Tennessee Warbler (Vermivora peregrina). c. 11 sighted, 1 heard. aspen woodland on tableland and on valley slopes.
Magnolia Warbler (Dendroica magnolia). uc. 2 sighted. aspen and poplar woodlands on lower valley slopes.
Connecticut Warbler (Oporornis agilis). uc. 2 heard. aspen and mixedwood along valley slopes.
Common Yellowthroat (Geothlypsis triches). uc. 1 sighted. aspen shrubland on tableland.
Red-winged Blackbird (Agelaius phoeniceus). uc. 1 sighted. abandoned beaver pond in slump impoundment on July 23.
American Redstart (Setophaga ruticilla). uc. 1 sighted. aspen woodland on table.
Northern Oriole (Icterus galbula). fc. 2 sighted. aspen - grassland edge along ridge.
Brown-headed Cowbird (Molothrus ater). uc. 1 sighted. aspen cleared field edge southeast corner of area.
Rose-breasted Grosbeak (Pheucticus ludovicianus). uc. 1 sighted. aspen woodland.
Le Conte's Sparrow (Amnospiza leconteii). uc. 1 sighted. shrubland along creek valley.
Dark-eyed Junco (Junco hyemalis). uc. 1 sighted. aspen woodland on tableland.

Chipping Sparrow (Spizella passerina). fc. 3 heard/sighted. aspen woodland on upper valley slopes.
Clay-coloured Sparrow (Spizella pallida). fc. 3 heard. aspen - shrubland on upper valley slopes.
White-throated Sparrow (Zonotrichia albicollis). c. 10 heard. aspen, poplar and mixedwoods along creek valleys.
Lincoln's Sparrow (Melospiza lincolnii). uc. 1 heard. slough adjacent to southeast edge of area.
Song Sparrow (Melospiza melodia). uc. 1 heard. aspen woodland along valley slopes.

NOTE: Nomenclature follows Salt and Salt (1976) with changes from N. American Checklist of Birds in Alberta Naturalist 13(1); March 1983.

Abundance Codes

c	common	-	birds most likely to be observed on an outing
fc	fairly common	-	birds readily observed but not as frequently or in as high numbers as common species
uc	uncommon	-	seen less-frequently than fairly common species
o	occasional	-	observed over a season
r	rare	-	not necessarily observed over a season

All sightings/song identifications made during bird survey June 14-15, 1984 by J. Rintoul and J. Sisson unless indicated otherwise.

A total of 44 species were identified.

APPENDIX 7.4

ANNOTATED LIST OF AMPHIBIANS AND REPTILES OBSERVED AT THE SILVER VALLEY STUDY AREA, JUNE-JULY 1984

Boreal Chorus Frog (Pseudacris triseriata) - heard in aspen woodland adjacent to southeast corner of area

Common Garter Snake (Thamnophis sirtalis) - 1 sighted in abandoned channel; 1 shed skin collected on steep south-facing grassland (subsequently identified by Provincial Museum staff)

NOTE: Nomenclature follows Stebbins (1966).

APPENDIX 7.5

FISH SPECIES COLLECTED IN THE PEACE RIVER (B.C.-DUNVEGAN REACH)

Goldeye (Hiodon alosoides)
Northern Pike (Esox lusctus)
Mountain Whitefish (Prosopium williamsoni)
Lake Whitefish (Coregonus clupeaformis)
Walleye (Stizostedion vitreum)
Flathead Chub (Platygobio gracilis)
Lake Chub (Couesius plumbens)
Redside Shiner (Rhinicthys cataractae)
Longnose Dace (Richardsonius balteatus)
Northern Squawfish (Ptychocheilus oregonensis)
Longnose Sucker (Catastomus catastomus)
Largescale Sucker (Catastomus macrocheilus)
Burbot (Lota lota)
Trout Perch (Percopsis omiscomaycus)
Slimy Sculpin (Cottus cognatus)

SOURCE: Envirocon (1976).

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PEACE RIVER

Bedrock Outcrops

Bedrock Outcrops

Slump Mosaic

Level

Rich Herb Meadow

G: Steep Slope Grassland

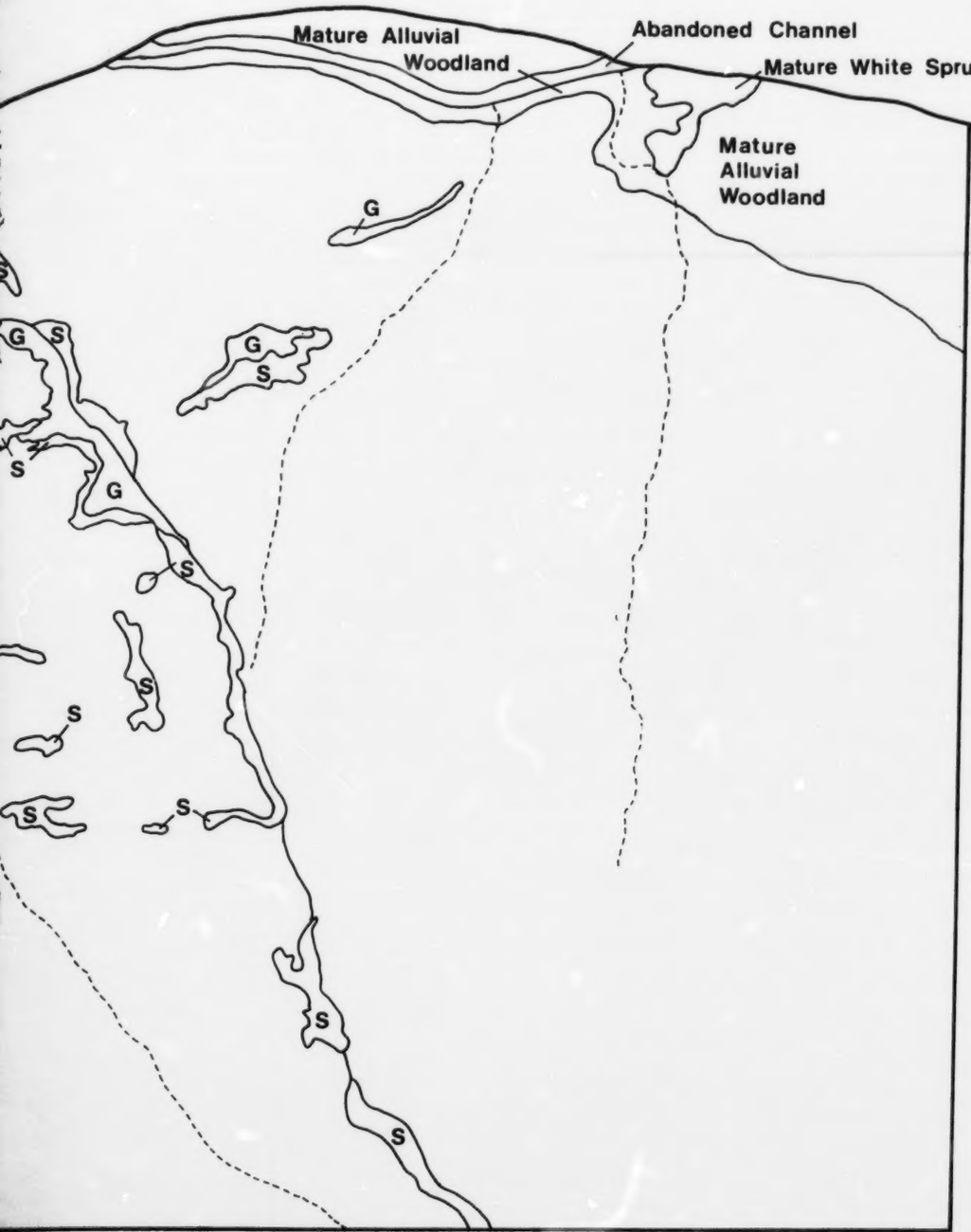
S: Shrublands

Map 8

SILVER VALLEY

SPECIAL FEATURES

Scale 1:15 000



Woodlands

- **Sw** – White Spruce – Horsetail
- **Bw** – White Birch – Horsetail
- **Pb1** – Balsam Poplar – Low-bush Cranberry – Wild Sarsaparilla
- **Pb2** – Balsam Poplar – Red-osier Dogwood
- **A1** – Aspen – Rose – Herb
- **A2** – Aspen (Lodgepole Pine) – Buffaloberry – Rose – Hairy Wild Rye
- **A3** – Aspen – Buffaloberry – Rose – Hairy Wild Rye – Bluebell
- **A4** – Aspen – Willow – Buffaloberry – Reedgrass
- **A5** – Aspen (Lodgepole Pine) – Willow – Reedgrass

Shrublands

- **S1** – Buffaloberry – Rose – Hairy Wild Rye
- **S** – Saskatoon – Rose
  – Saskatoon – Buffaloberry – Dogbane

Wetlands

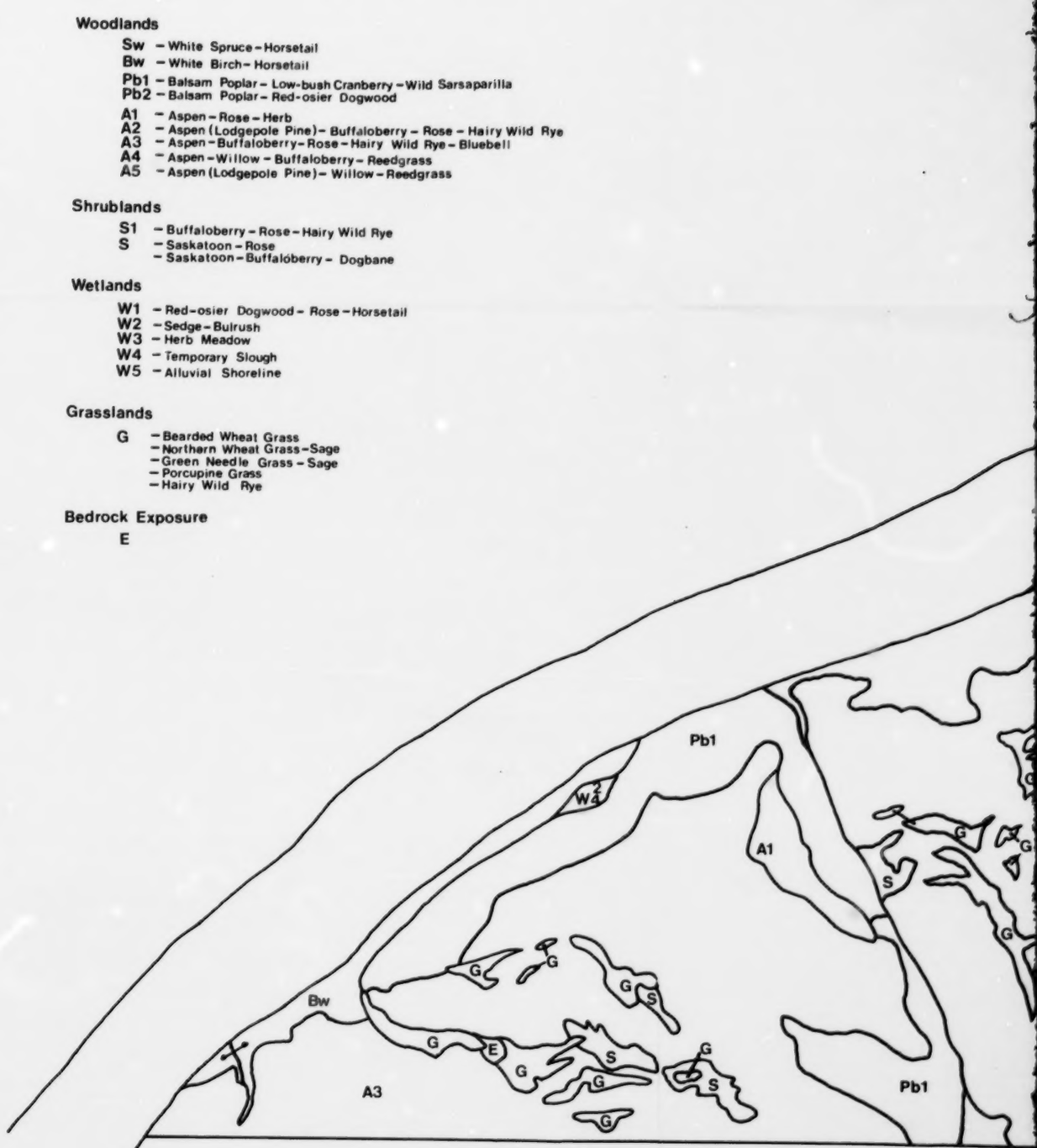
- **W1** – Red-osier Dogwood – Rose – Horsetail
- **W2** – Sedge – Bulrush
- **W3** – Herb Meadow
- **W4** – Temporary Slough
- **W5** – Alluvial Shoreline

Grasslands

- **G** – Bearded Wheat Grass
  – Northern Wheat Grass – Sage
  – Green Needle Grass – Sage
  – Porcupine Grass
  – Hairy Wild Rye

Bedrock Exposure

- **E**



Map 7

PEACE RIVER

W2 Pb1 Bw Sw Sw Pb1 W2 Bw Sw Pb2 W1 W1 Bw Pb1 Pb1 A3 A3 A3 A3 A3 A3 A3 A3 A1 A1 A1 A1 E E E E W5 W5 W5 W3 Pb1 Pb1 Pb1 Pb1 Pb1 A4 A4 A4.5 A A3/Pb1 G S S1

SILVER VALLEY

VEGETATION

Scale 1:15 000

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